

ERNEST BORN

1936

THE
ARCHITECTURAL RECORD

1936

5

RISK RATING OF MORTGAGES • ACTIVE BUILDING TYPES

"They never
let me down.."



famous radio star

"VOICE OF EXPERIMENT" *
endorses Venus Pencils — and how

"THE first Law of Superiority is to get rid of Scratchitus (gritty pencils). Nothing knocks out one's Ego quicker or flatter than scribbling.

"Nothing degrades the Oversoul more than illegible writing—it causes innumerable misunderstandings—wrecks offices, devastates homes.

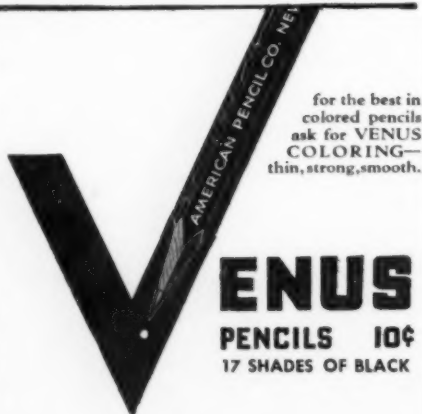
"I and 3,079,621 of my faithful listeners — long sufferers from Scratchitus and everything else — certainly owe a debt of gratitude to Venus Pencils.

"I use, I approve, I recommend these smooth-writing Venus Pencils. I tell my audience: 'You can't get ahead without being freed of Scratchitus (gritty pencils).'

"I tried out every pencil, finding Venus Pencils give you a Lift. They make you sing while you work—and give you Young Ideas.

"If you want to belong to the Elect, get that Inner Urge of Creativeness that comes with using Venus Pencils. It is my Word."

* This voluntary, ecstatic testimonial, we suppose, is a publicity gag for "The Voice of Experiment," but it tells why Venus Pencils have won First Place—they're smooth!



• This advertisement appears
in Collier's and Time.

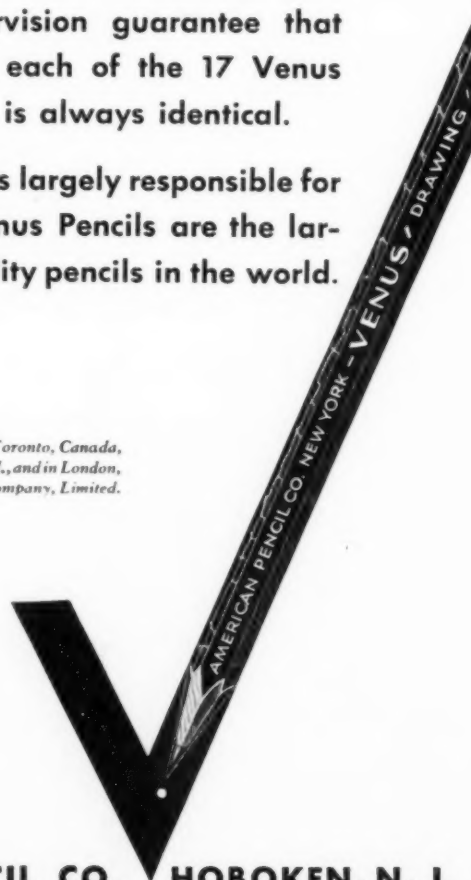
Naturally you assume the smoothness of Venus Pencils—that we stress as important in this advertisement to the general public.

Architects and engineers are more interested in accurate grading—a subject that emphasizes Venus superiority. Professional pencil users have come to rely on the absolute precision of these internationally famous pencils.

Year in and year out, costly tests and elaborate supervision guarantee that every pencil in each of the 17 Venus shades of black is always identical.

This uniformity is largely responsible for the fact that Venus Pencils are the largest selling quality pencils in the world.

Venus Pencils are also made in Toronto, Canada, by the Venus Pencil Company, Ltd., and in London, England, by the Venus Pencil Company, Limited.



AMERICAN PENCIL CO. HOBOKEN, N. J.

THE ARCHITECTURAL RECORD

VOLUME 79 NUMBER 5 MAY, 1936

PRINTING DISTRICT, NEW YORK CITY. Photograph by Samuel H. Gottscho

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THESE HOUSES OF STUCCO

"Went like hot cakes"



Six Atlas White stucco homes, six different color combinations, six different textures. Average cost of each house—\$6,000. Location—Missoula, Montana. Architect and builder—O. B. Parsons.

● It wasn't any job to find tenants for these houses. Every house in the row was rented before it was finished. For these houses are "right" for quick selling or renting. Small. Moderately priced. Attractive inside and out.

For an exterior finish of lasting beauty it is hard to beat the simple effectiveness of stucco made with Atlas White Portland Cement.

White portland cement stucco, used either in new construction or for modernizing, has certain definite advantages.

1. It is a *durable* finish—a thin sturdy wall of concrete that gives the permanence, weather resistance and fire resistance of concrete.

2. It can be applied in any texture suited to the architectural design.

3. Any color is available in stucco made with white portland cement.

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UNIVERSAL ATLAS CEMENT CO.
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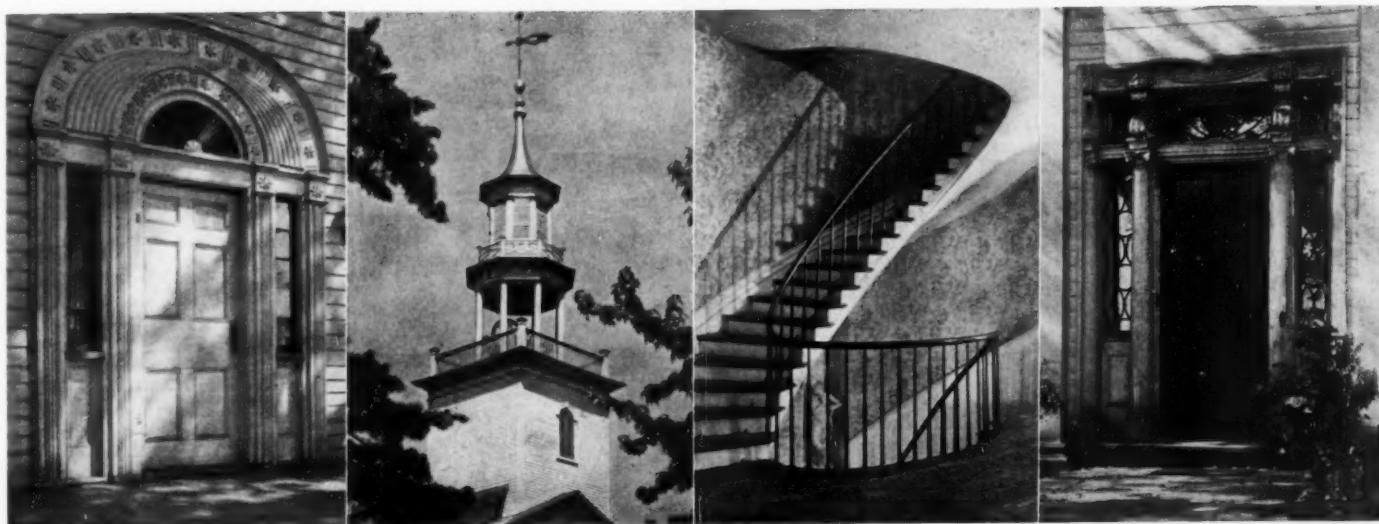


A FACTORY PREPARED STUCCO IS PREFERABLE

S-4

STUCCO MADE WITH **Atlas White** PORTLAND CEMENT

REVIEW OF CURRENT BOOKS



ANONYMOUS ARCHITECTURE FROM THE WESTERN RESERVE

From: "Early Homes of Ohio" by I. T. Frary

EARLY HOMES OF OHIO by I. T. Frary. Garrett and Massie, Richmond, Va. 336 pp. \$5

The great style movements of Eighteenth- and Nineteenth-Century American architecture provide one of our best records of that period. The ability of these movements to retain their own peculiar identity while adapting themselves to infinite variations in climate, materials, economic and social behaviors constitutes an architectural phenomena which has not been witnessed since. They therefore, as Mr. Frary suggests, "challenge our admiration." But they are only of value in an *historical sense*; they are only intelligible when viewed in their proper context in time.

Colonial builders operated within the limits of their age. The state of their

sciences limited them to one general principle of construction—the pier and lintel; the state of their economics limited them to the use of local materials. Within these limits they planned and built remarkably well; but their solutions are no longer valid, their problems no longer exist. It is for this reason that the archaeological works now flooding the market should be critically examined. There is a profound difference between appreciating the past and trying to escape to it. On the whole, Mr. Frary's attitude towards the architecture of early Ohio is a sane one. His book is a conscientious piece of research, well illustrated with his own photographs, some of which are quite lovely. His text is not too nostalgic, although on page 27 he descends to anecdote: A tenant of a

modern efficiency apartment crossed the hall to call on a neighbor. "Her knock brought no response for several minutes; then the door opened revealing the embarrassing fact that the gentleman of the house had retired in the bottom drawer of the sideboard . . . his resourceful wife merely closed the drawer until only his head was exposed and then entertained her guest with perfect propriety." This constitutes a just indictment of modern commercial housing, no doubt; but it conveniently overlooks similar shortcomings in Colonial housing, such as the "bundling" custom of entertaining one's friends in bed or bathing in a tin tub near the kitchen stove. In other words, dissatisfaction with the present should force us forward, not back.

DECORATIVE ART. *Thirty-first annual issue Studio Year Book.* Edited by C. G. Holme. Studio Publications, Inc., 381 Fourth Avenue, New York City. 140 pp. Cloth, \$4.50; paper, \$3.50

A portfolio of selected houses and decorative arts of the past year. The emphasis is on exteriors and interiors of houses. There are some plates in

color. American architects are fairly well represented. Practically all houses are flat rooted and the planning shown is indicative of the new trend—with an open arrangement of rooms, and with roof and garden terraces. The well-lighted interiors offer proof of attractiveness derived from modern furniture arranged against a background of color and plain surfaces.



THIS TYPE OF STRUCTURE IS PASSING
From: "The English Country House" by Ralph Dutton

THE ENGLISH COUNTRY HOUSE by Ralph Dutton. Charles Scribner's Sons, New York City. 120 pp. \$2.75

A pleasant enough little book, sympathetically illustrated by a large collection of good photographs by Mr. Will F. Taylor. Conscientiously exploring

the long tradition of the great country house, Mr. Dutton finds it culminated in "The Cult of the Antique." Mr. Osbert Sitwell, in his Foreword, is also aware of the decline and fall of this tradition and wonders: "What country houses of any size can hope to survive the next fifty years?"

TO BE REVIEWED

American School and University: Eighth Annual Edition. American School Publishing Company, 470 Fourth Avenue, N. Y. C.

Architectural Graphic Standards: by Ramsey and Sleeper. John Wiley and Sons, New York and London. Price: \$6

City Planning Housing: by Werner Hegemann. Architectural Book Publishing Co., Inc., 112 West 46 Street, N. Y. C. Price: \$3.75

Descriptive Geometry: by C. H. Schumann, Jr. D. Van Nostrand Company, Inc., 250 Fourth Avenue, N. Y. C. Price: \$2.75

State Planning: National Resources Board. Government Printing Office, Washington, D. C. Price: .75

Steadyflow Traffic System: by Fritz Malcher. Harvard University Press, Cambridge, Mass.

RECEIVED

Beginning Mechanical Drawing Units: by W. E. Roberts. The Manual Arts Press, Peoria, Illinois. Price: .88

Continuity in Concrete Building Frames: Practical Analysis for Vertical Load and Wind Pressure. Portland Cement Association, 33 W. Grand Street, Chicago, Illinois.

Designs for Wood-Carving: by Herbert W. Faulkner. Harper and Brothers, New York City. Price: \$1

Manual of Appraisals. E. H. Boeckh and Associates. Rough Notes Company, Indianapolis, Ind. \$5.50

Properties of Mortars and Concretes Containing Portland-Puzzolan Cements. R. E. Davis, J. W. Kelley, G. E. Troxell and H. E. Davis: American Concrete Institute, 7400 Second Boulevard, Detroit, Mich.

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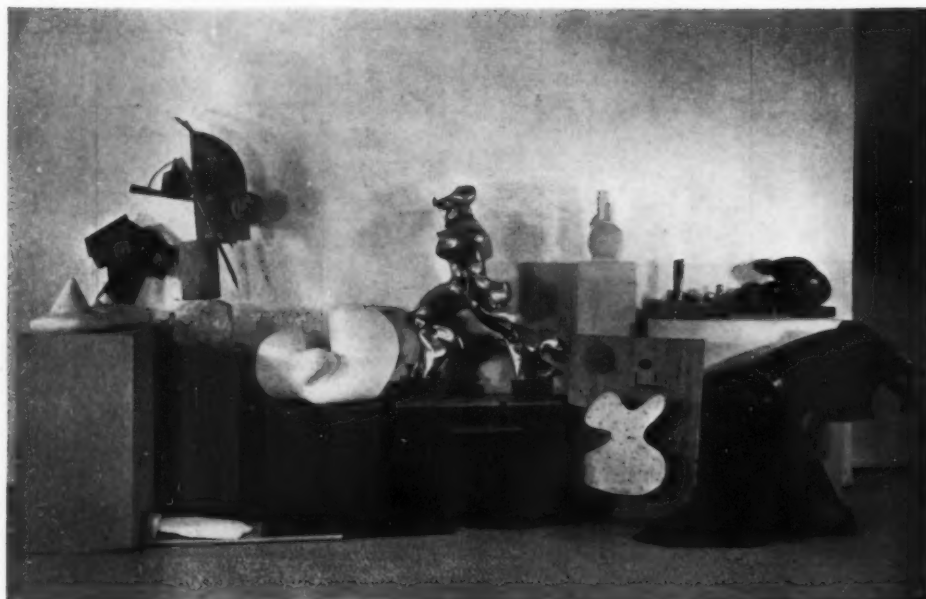
NEXT MONTH

A SPECIAL NUMBER ON EDUCATIONAL BUILDINGS, INCLUDING SCHOOLS AND COLLEGES, PUBLIC AND PRIVATE, WITH SUCH ACCESSORY BUILDINGS AS LABORATORIES, LIBRARIES, GYMNASIUMS, DORMITORIES AND THE LIKE.

The shortage of educational buildings is extremely urgent. It is due largely to deferred construction but more especially to obsolescence. The system of education is in process of reorganization, in response to increased specialization in courses of instruction and community service and of increased mechanization of both buildings and teaching adjuncts. School authorities and architects are impelled to economize on the structural shell for the benefit of the plan and equipment, with the result that the newer buildings represent significant developments in architectural expression as well as in educational and social service functions.

LEADING ARTICLES: THE CHANGING AMERICAN SYSTEM OF EDUCATION. By James E. Mendenhall . . . THE EDUCATIONAL PLANT AND ITS DEVELOPMENT. By William G. Carr . . . PLANNING THE CLASSROOM FOR RADIO AND MOVIES. By F. L. Devereux . . . A MODERN BIBLIOGRAPHY OF SCHOOL DESIGN. By Earl Sykes . . . CHANGED ARCHITECTURAL REQUIREMENTS OF THE SCHOOL PLANT. By John J. Donovan . . . PORTFOLIO OF MODERN EDUCATIONAL PLANTS

NEWS OF THE MONTH



Photographs by S. Sunami

IS THIS ART? THE U. S. CUSTOMS OFFICIALS THINK NOT

Included in the current exhibition of cubism and abstract art at New York's Museum of Modern Art is the group of 19 sculptures shown above. When these objects arrived in this country the Museum sought to enter them as works of art, under paragraph 1,807 of the U. S. Customs Tariff, which provides for the importation of original paintings and sculpture as works of art, duty free. The 19 sculptures were refused. They were all original as defined by the paragraph; "they were simply not considered to be works of art by the customs' examiners." The Museum was informed that since they were not works of art a duty would be based upon their declared value; the duty in such a case would be prohibitive since the owners had naturally declared their value as works of art and not as raw material.



A. Pevsner: 1926



A. Pevsner: 1934



C. Brancusi: 1915

"The Museum made no claim as to the aesthetic merits of the objects in question: its position only was that the objects were created as works of art and that it intended to exhibit them as such." However, the sculptures were only admitted under bond, because they did not conform to the U. S. Customs definition of works of art, as being limited to "imitations of natural objects, chiefly of the human form, in their true proportion of length, breadth and thickness."

Art or no, the exhibition is interesting for the striking similarity between the paintings, prints, sculpture, architecture and furniture displayed. It reveals European architects and artists re-analyzing their concepts of the modern world and expressing themselves in the new techniques and media which are products of that world. Architect or sculptor, they are found using polished brass, nickel steel, plate glass, and even newsprint in an effort either to build or to represent their concept of modern society.

In his Introduction to the catalog of the Exhibition, *Cubism and Abstract Art*, Mr. Alfred H. Barr, Jr., Director of the Museum, writes: "Sometimes in the history of art it is possible to describe a period or a generation of artists as having been obsessed by a particular problem. The artists of the early fifteenth century, for instance, were moved by a passion for imitating nature. . . . In the early twentieth century the dominant interest was almost exactly opposite. The pictorial conquest of the external visual world had been completed and refined many times and in different ways during the previous half-millennium. The more adventurous and original artists were by a common and powerful impulse . . . driven to abandon the imitation of natural appearance."

MILAN OPENS EXHIBITION OF MODERN HOUSING

Opening this month in Milan is the International Exposition of Decorative Arts, Industrial Design and Modern Architecture. Planned as a demonstration of Fascist progress, the Exposition has the endorsement of Mussolini himself. Particular emphasis is to be laid on the Section of Modern Housing which "conforms to the wishes of Il Duce, who desires to get closer and closer to the masses." According to Exposition officials this Section will concentrate on "three distinct social categories—the laborer, the white collar worker, and the professional man whose housing problems interest a large class to which no special attention has been given even in public housing."

As solutions to the housing problem of these categories, the Section on Modern Housing has this to offer: "a guest room for a boarding house or a hotel and two types of little offices annexed to the

house at the side." This is offered as "a complement of little organisms dedicated to the practical life of the same social classes to which this Exposition is directed."



A PRIZE-WINNING ADVERTISING SIGN

Four hundred dollars worth of metal letters helped win for William Ginsberg, New York City engineer, a citation of architectural merit in the recent Washington Board of Trade architectural competition. The Washington Daily News Building, designed by Mr. Ginsberg, was one of four structures in the Capital chosen for its architectural merit. The citation read: "This award is made for the essentially modest and utilitarian character, together with the really successful and decorative use and placement of an essential advertising sign." Mr. Ginsberg, when interviewed in his New York office, said that economy in structural design resulted in architectural simplicity. He estimated the total cost of the Daily News Building at \$200,000, of which \$3,000 was the cost of the architecture and \$400 the cost of the sign.

COMMISSIONER MOVES SHRUBS, ESCAPES COURT'S WRATH

It took the New York Supreme Court to clear Park Commissioner Robert Moses of the contempt charge growing out of his having moved some shrubbery from around the Central Park Casino. The charge grew out of a "taxpayer's suit to prevent waste of city property" brought by Louis H. Saltzman, a restaurateur who holds the Casino concession. Mr. Moses explained that he did not realize that the temporary injunction applied to the grounds as well as structure.

HOUSER WINS GUGGENHEIM AWARD

Winning the first Guggenheim Foundation award made in architecture or housing, Miss Catherine Bauer of Washington, D. C., has been granted a Fellowship for a year's intensive study of European housing. Miss Bauer, author of last year's "Modern Housing," is one of the first American housers to touch upon the connection between organized labor and low-rent housing. In 1930 and again in 1932 she was in Europe "looking at housing, modern architecture and city planning—particularly in Germany, Holland, Austria and England." This year her plans are slightly different—"a closer look at Scandinavia, the work under recent legislation in England and, if I have time, something of how Germany and Italy have utilized subsistence homesteads for the purposes of Fascism." Most of all, Miss Bauer wants to study "the achievements of the last five years in Soviet Russia. . . . In Russia I think it will be possible to see how housing is tied in with the regional planning of resources and other broad economic activities."

Miss Bauer was born in Elizabeth, N. J., in 1905; graduated from Vassar in 1926; studied architecture at Cornell 1924-1925. In New York she had a series of jobs "of which the most impressive-sounding was pattern-promotion manager of Butterick." She went to Europe in 1930 "to look at modern architecture—from a purely aesthetic angle." She discovered "almost immediately that modern architecture was all tied in with the housing movement." Returning to New York, she did free lance research in housing and planning, free lance writing in architecture and housing. In the spring of 1931 she won a \$1,000 prize from *Fortune* Magazine for an essay, "Art in Industry," on housing in Frankfurt, Germany. "That piece of luck made me a 'housing expert' whether I wanted to be or not." In 1932 she returned to Europe to do a series of housing articles for *Fortune* in collaboration with Lewis Mumford. "*Fortune*, however, did not use very much of our material, which made me want to put it all in a book."

Since 1934 Miss Bauer has been active in the Labor Housing Conference of which she is Executive Secretary. For the past year she has also been Consultant to the PWA Housing Division and the Subur-



Miss Catherine Bauer

ban Resettlement Division of the Resettlement Administration.

DESIGNS FOR AUTOMOBILE SALON NET STUDENTS \$900

James Harrison Finch, Georgia Tech architectural student, was awarded a first prize of \$500 in the fifth annual Illuminating Engineering Society-Beaux Arts Institute Competition. The problem this year was the design of an automobile salon with especial attention to lighting. Second prize, \$250, to V. J. Miller, University of Illinois; third prize, \$150, to Ray Stuermer, also University of Illinois.



THESE TOWERS HAVE SCIENTIFIC SHADOWS

A dramatic picture of a new housing project recently completed at Drancy, outside of Paris. The project is notable for its construction as well as its plan. A system of prefabricated reinforced concrete construction is used, the basis of which is that precast units, erected on a light steel framework, form a permanent shuttering for concrete poured between them and an inner casing of cellular concrete units, the original steel frame acting as reinforcement. The 15-story towers are so placed on the plan that their shadows never fall across adjoining buildings.

NEWS OF THE MONTH

DESTRUCTION IN THE U. S.



The Potomac visits Paw Paw, W. Va.



Quiet waters mirror St. Paul houses



Wheeling houses beyond help of architects



Maryland family saves bedding and hound

This spring's widespread and disastrous series of floods caused the loss of many lives and hundreds of millions of dollars' property damage in eastern United States. The gigantic task of reconstruct-

ing devastated areas is hampered by lack of adequate Federal funds. Various described as "inevitable" on the one hand, as "no act of God" on the other, flood control work will inevitably be accelerated by these disasters. Already Congress is flooded with legislation, while from Chattanooga, Tenn., comes the report that TVA flood control work reduced the flood crest 3 feet in that city.

TWO FHA HOUSING PROJECTS BEGUN

Two low-cost housing projects insured by the FHA entered the stage of active construction last month when the mortgages were sold. The mortgage on the Meadville, Pennsylvania, project, involving \$1,012,000, was bought by the Pennsylvania Workmen's Insurance Board. The New York Life Insurance Company is mortgagee for the \$638,200 Wilmington, Delaware, housing project.

VALUE OF POESY IN BUILDING BOOM EXPLORED

Reynolds Corporation mobilized poets, song writers and dreamers to start the building boom at a dinner last month in a downtown New York office building. Mr. Richard S. Reynolds, president, called upon the group of newspaper and magazine writers who were his guests to glorify home ownership in poetry, song and story.

Mr. Reynolds started the ball rolling:

"Build me a home, I am lonely,
Lonely for a chimney and cat.
I've been about and I've found out
Life's too big for a flat."

Mr. Joseph Auslander, poet, of Columbia University, followed with

"Build me a home, I am hungry
For the bark of a dog in a lane,
For the sight of a light in a widow at night
And the song of a roof in the rain."

His wife, Audrey Wurdemann, Pulitzer prize winner in poetry, closed the trilogy thus:

"Build me a home in a corner
With my window flush with the lawn;
Where life overflows on the heart of a rose,
Where birds may wake me at dawn."

Mr. William S. Winthrop, musician, of Ridgefield Lakes, Conn., citing the practical effect of such tunes as "Moon Over Miami" and "Hawaiian Moonlight" in attracting visitors and even in promoting

real estate sales in the territories they advertised, expressed the conviction that if the romance of the home could be more generally recognized in song and story the builder's work would be made easier. One discordant note was struck by a minister, in three stanzas of protest, based on the idea that "city landlords and city ministers constantly are losing church officers and workers to the suburbs." Another impromptu ministerial poem contained unfortunate references to "second mortgages, damp cellars and the slowness of commuting trains."

The Reynolds Corporation is not a publishing house but a large manufacturer of building materials and equipment.

MORE GOTHIC FOR THE UNIVERSITY OF CHICAGO

Zantzing and Borie, of Philadelphia, have been commissioned by the University of Chicago to design the new building which will be erected on the Midway to house the headquarters of the Public Administration Clearing House and nearly a score of other organizations interested in the improvement of public administration.

Cost of the structure is estimated at between \$500,000 and \$600,000. In conformity with the architectural scheme of the University, the building will be of Gothic design, with a limestone exterior.



Wide World Photo

LA VIE PARISIENNE

During one of the recent drills for the protection of civilian Paris against air attacks, a group from the neighborhood overhead occupied this underground shelter for 4 hours. The shelter, with a capacity of 52 persons, is of reinforced concrete with complete air conditioning, and is typical of the shelters being built throughout Paris. As war danger becomes more acute, architects and building designers are called on for novel types of shelter construction. As a protection against gas (but not bombs) the authorities have evolved a gas-proof canvas shelter.



658 BUFFALO FAMILIES WILL ENJOY LOW RENTS

Another of PWA's 49 low-rent housing projects, Kenfield, at Buffalo, N. Y., is released for construction. The project, which will cost \$4,500,000, includes 658 living units in 2- and 3-story flats, recreational buildings, playgrounds and parks.

PWA HOUSING PROGRAM REACHES CONSTRUCTION STAGE, AWAITS NEW FUNDS

A 130-unit project in Puerto Rico and three projects in the Virgin Isles, totaling 146 dwelling units, are now under construction. This is a part of the PWA's "national demonstration program of slum-clearance and low-cost housing," according to A. R. Clas, Director of the PWA Housing Division. The program includes 44 other projects in 35 U. S. cities. When completed these developments will provide approximately 25,000 families of the low-income group with sanitary living quarters. Seven housing developments erected by limited dividend corporations, operating on PWA loans and under Housing Division supervision, are now occupied.

Of the sites requiring demolition, 17 have already been cleared; demolition is proceeding in 26 others. Construction of foundations is under way on 23 projects. General construction is under way on 11 projects and landscaping bids have been accepted on 5 projects and proceed orders issued.

Pending the allocation of more funds, the Housing Division has indefinitely suspended all other projects either announced or initiated. Under the Wagner-Allenbogen Bill, recently introduced into Congress, the Housing Division would be assimilated into a proposed "United States Housing Authority" whose primary duty would be to assist local public housing agencies, by grants and loans, to provide decent low-rent housing in their localities. It would also have the right to develop and ad-

minister demonstration projects both of low-rent housing and slum clearance but only upon the request and with the advice of local organizations and committees. The Authority would have other minor powers, including the right to make surveys and studies and to encourage research and experimentation in various aspects of housing.

GREAT LAKES EXPOSITION GETS NEW CONSTRUCTION CHIEF

Albert N. Gonsior, former superintendent of construction at the Century of Progress, Chicago, has been appointed chief of construction at the Great Lakes Exposition, Cleveland, which will open on June 27. Mr. Gonsior is a graduate of the engineering school of the University of Illinois and, as chief of construction at the Chicago Fair, was assistant to Daniel Burnham, works director.

NATIONAL WATER PLAN PROPOSED

A "National Water Plan" directed to the control of floods, erosion and water pollution; to the uses of water for domestic purposes, irrigation and power; and to the drainage of water-logged and overflowed lands, will be delivered to President Roosevelt before December 1, 1936, by the National Resources Committee. Recognizing the vital necessity of a national flood control program at a time when the eastern half of the United States has just experienced one of the most generally disastrous series of floods in its history, the Water Resources Committee of the Resources Organization is hastening its efforts to bring a developed program of flood control into relationship with a comprehensive program for the better conservation and use of all waters.

"The need for a general program of flood control in relation to other water problems becomes apparent when we realize that there are many river basins in the United States where floods are likely to occur in just as dramatic a manner as we have seen in New England cities, in Pittsburgh, in Johnstown, Pennsylvania, and other eastern cities in the last few days," Secretary of the Interior Harold L. Ickes, who is also Chairman of the National Resources Committee, said recently.

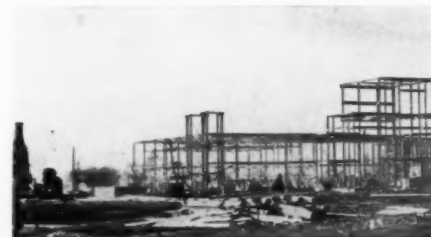
CONSTRUCTION IN THE U. S.



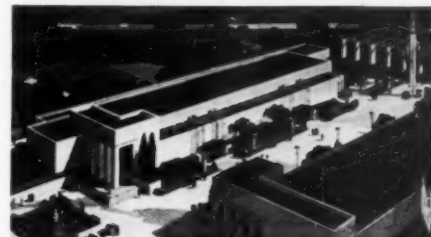
Machinery speeds the work



Old buildings get new faces



"Petroleum" and "Communications" are housed



"Agriculture" and "Food" will look like this

Work on the southwest's first World's Fair, the \$25,000,000 Texas Centennial Exposition, is being rushed in Dallas. The Fair is being held on an old exposition site, the plan of which has been redesigned to conform to modern trends in exposition design. A number of existing buildings are being moved and remodeled and the new buildings, some of which are intended to be permanent, are being located according to this revised plan.

The Exposition opens on June 6.

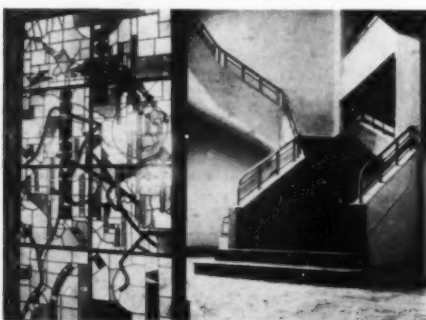
NEWS OF THE MONTH



London News Agency Photo

HOUSERS TO SAIL ON "QUEEN MARY"

A few reservations on the Queen Mary are still open for those wishing to join the public housing tour of Europe to be led this summer by NPHC's secretary, Helen Alfred. Sailing on the Queen Mary, July 8, the group making the trip will visit housing developments in France, Czechoslovakia, Russia, the Baltic nations, the Scandinavian peninsula and England. Official contacts and personal investigation in all centers to be visited are assured. All-inclusive New York-to-New York cost for the trip is \$661.50. Further information from National Public Housing Conference, 112 East 19 Street, New York.



Pressephotos, Berlin

MODERN ARCHITECTURE IN THE PUPPET EMPIRE

A stairway in the recently completed Foreign Office in Hsinking, Manchukuo. Notice the map in the stained glass door at the left.

SYRACUSE ACQUIRES BROCKWAY ARCHITECTURAL LIBRARY

Acquisition of the architectural library of the late Albert L. Brockway, a collection of approximately 400 volumes, by the department of architecture, Syracuse University, has been announced by Dean Harold L. Butler of the College of Fine Arts. The Brockway collection will become a part of the branch library in Slocum Hall, which houses the department of architecture. The new library includes many valuable editions collected

personally by Mr. Brockway, who was instrumental in organizing the department of architecture and who served as its first head 40 years ago.

He began his library while studying in the Ecole des Beaux Arts, Paris, during 1886-87, and these early volumes show a preference for the French institution and viewpoint. Later additions, made from year to year, indicate an increasing comprehension of taste with the inclusion of standard works on ancient and modern English, French, German, Italian, Spanish, and American architecture. Also, a number of books deal with allied arts of painting, sculpture, civic planning, garden, art, industrial design, furniture, and decoration.

SWARTHMORE PRESIDENT EXPLAINS UNUSUAL FIELD HOUSE

Elsewhere in this issue is illustrated the new Field House at Swarthmore College, Swarthmore, Pennsylvania. President Frank Aydelotte points out that gymnasium design is determined by the athletic functions it is intended to house. Swarthmore, he says, is not primarily interested in spectator sports.

"Intercollegiate sports, especially football, are at present lamentably overemphasized

in American colleges and universities. Athletics are a principal source of newspaper publicity and advertising for which American colleges have unhealthy craving, and many institutions exploit their student athletic teams shamelessly for this purpose. Students who have seen their university authorities resort to unfair practices in order to win athletic contests will inevitably imitate those practices of success in business or politics. "The cure for such evils, however, is not, in my opinion, the abolition of intercollegiate athletics. It is instead the maintenance of sane, healthy athletic activities without undue publicity, and with emphasis upon the health and recreation which can be found in games, rather than upon attracting spectators or winning victories. The remedy lies further in providing so many opportunities for athletic sports that large numbers can engage in them with the consequent lessening of the importance of any single sport or any single contest. It is along these lines that our athletic policy at Swarthmore has been directed.

"It should be our aim to give to every individual, who has sufficient athletic ability and interest, the opportunity in college to belong to some team in which he can have the fun of competing against other colleges and to give him the chance as well to learn some individual game which he can continue to play after graduation. The new Field House brings us measurably nearer to the realization of these aims."

WHEN IS A NUDE NOT NAKED?

An art jury, faced with the task of selecting a Texas Centennial statue, tentatively suggested Sculptor William Zorach's nude pioneer group of a man, a woman, a youth and a baby as a suitable memorial to Texas' 100 years of statehood. Two camps of opinion formed at once. The Right maintained that "pioneer Texas would have hanged to the nearest tree any family group going around naked like that." The Left asked: "Are we to pick out a replica of Grandma or Great-aunt Agatha and put her in an alpaca frock and sunbonnet?" The sculpture, planned as a memorial for the campus of Texas State College for Women, at Denton, was defended by one jury member as being "not a literal anatomical nude. It is abstract."

CALENDAR OF EXHIBITIONS AND EVENTS

- May 5-8—Annual Convention, American Institute of Architects, Williamsburg, Virginia.
- May 25-28—Judging and Awards, Oregon State Capitol Competition, Salem, Oregon.
- June 1—Opening, Pennsylvania Academy of Fine Arts Summer School, Chester, Pa.
- June 6—Opening, Texas Centennial Central Exposition, in Dallas, Texas.
- June 22—Opening, Booth Travelling Fellowship Competition, College of Architecture, University of Michigan, Ann Arbor.
- June 27—Opening, Great Lakes Exposition, Cleveland, Ohio.
- June 29—Opening, Summer School, College of Architecture, University of Michigan, Ann Arbor.

OBITUARIES

Werner Hegemann died April 12 at the age of 55. His death brings to a close an active and varied career which, as teacher, editor and city planner, took him to all parts of the world. Although a native of Germany he was employed throughout the world. In 1905 he became housing inspector for Philadelphia and supervised the first city planning exhibition in Boston in 1909. Returning to Germany in 1910, his deep interest in socialist labor unions led to an aggressive campaign for a more decentralized system of housing which brought him against the authorities. From 1913 to 1915 he conducted a number of planning projects in the San Francisco region. Later, in 1921, he was helping to direct important real estate work in Wisconsin and Pennsylvania. From 1924 to 1933 he was intermittently city planning consultant to the German cities of Leipzig and Muenster and to Buenos Aires and Rosario in Argentina. He was exiled from Germany in 1933 due to two of his books, "History Unmasked," an ironic critique of Hitler's aims, and "Frederick the Great," in which he classified the Prussian King as being "as great a scoundrel as Hitler." Since February of last year he had been associate in architecture at Columbia University. His most recent book, "City Planning Housing," was published April 1.



THE ARTIST LOOKS AT CHAIN STORE ARCHITECTURE

From the grisly purple-red of its imitation mahogany to the "modernistic" design of its lighting fixtures, Philip Reisman has overlooked nothing in his painting, "Drug Store." All the artist's work shows a deep interest in contemporary architecture and constitutes a shrewd comment on how bad most of it is. From the current New York show of the artist's work.

Albert Farwell Bemis died April 11 at the age of 65 as a result of an accident in a Grand Canyon hotel. Mr. Bemis, long prominent for his interest and research in housing, was the author of a trilogy called "The Evolving House." In 1934 he completed a survey of governmental housing projects in this country and abroad, in which he denounced participation of the Federal government in then projected housing enterprises. He was a life member of the corporation of Massachusetts Institute of Technology of which he was a graduate and, in 1910, was elected president of the alumni.

Dead at the age of 79 years is C. Howard Walker, practicing architect in Boston for more than half a century. He had designed many structures in every section of the United States, and planned and was architect-in-chief of the Omaha Exposition in 1898 and the St. Louis Exposition in 1904. During a long career he lectured at Harvard College, the Massachusetts Institute of Technology, Museum of Fine Arts, the Lowell Institute and the Child-Walker School of Fine Arts. He is said to have been a pioneer automobile designer, having done some of the earliest work in automotive streamlining.



Central Press Photos, Ltd.

THE SHAPE OF THINGS TO COME

An exhibit from the recent Ideal Homes Exhibition at Olympia, London. All the furnishings in this exhibit are of glass, including the chair in which the young lady sits.

BOOTH TRAVELLING FELLOWSHIP RENEWED

The George G. Booth Travelling Fellowship in Architecture has been renewed this year and the competition in design will be conducted during the two weeks beginning June 22. The competition is open to all graduates of the school who have not reached their thirtieth birthday on that date. Further information from College of Architecture, University of Michigan, Ann Arbor.



PRINTING DISTRICT, NEW YORK CITY

Photograph by Samuel H. Gottsch

REMODELING FOR A BRANCH BANK

SHREVE, LAMB AND HARMON, ARCHITECTS

By William F. Lamb



F. S. Lincoln

EXTERIOR DOORWAY

In the summer of 1934 the Bankers Trust Company asked us to help them solve a problem which had for some time been developing in their branch at Fifth Avenue and 42nd Street. We had finished a year before the extensive alterations and enlargement of their main offices at 16 Wall Street so that we were not unfamiliar with their general requirements as far as they applied to their physical needs. The 42nd Street quarters, formerly occupied by the Astor Trust Company, which they had absorbed some years ago, were, while quite handsome, entirely inadequate for the amount of business being done even in those depression years. They were scattered through five floors and two basements which, naturally, resulted in great inefficiency of operation and expense for the protection of money and securities.

Three different lines of travel were taken to find the best road to the solution of their problem: rearrangement or enlargement of the 42nd Street quarters, which they held under a lease running until 1937; a new building on a site undetermined; and the alteration of other suitable buildings, of which there were several in the neighborhood.

Preliminary Investigations

In order to draw the map which was to guide us on our way, investigations lasting several months were undertaken both by the bank and by ourselves, which covered (1) a complete survey in great detail of the physical set-up of their quarters, which was then expanded to approximate the areas and arrangements which were required for them to function economically and to provide for future expansion; (2) a geographical count of their depositors, both as to number and importance, to determine the most convenient location; (3) a traffic survey insofar as it would affect new business; (4) an analysis of the trend of development, particularly in relation to the Grand Central Station and the then new development at Rockefeller Center, considering also the probability of the removal of the Sixth Avenue Elevated with the consequent improvement of that district.

Conclusions

As these investigations developed, several conclusions began to be indicated; the bank's old quarters could not be enlarged economically in any way that would materially help them and, further, their location was not as favorable either for their present or their future business as one a few blocks further to the north.

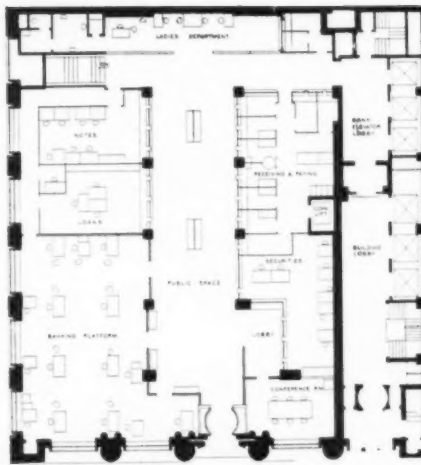
The first road proved to end in an impasse. We therefore kept on with our exploration of the other two, without letting the world at large know too much of our study.

Road number two was never very seriously explored; there were decided objections to building more space in an already glutted market, and a comparatively low building, for their use only, would have had to carry, even at the shrunken land values, an "overhead" which would not have been attractive. It was not a first choice, but rather a way that could be taken provided no suitable building could be found in the proper location.

BASEMENT



FIRST FLOOR



SECOND FLOOR



The third alternative seemed almost from the beginning to present the most reasonable solution, and of the available space investigated, that formerly occupied by the Harriman Bank on the southeast corner of Fifth Avenue and Forty-fourth Street answered most of the determined requirements. Its location near the center of the "depositor population" was convenient to Grand Central Station and to the developments on Fifth and Sixth Avenues; its entrances both on Fifth Avenue and on 44th Street were particularly adapted to motor traffic; and its façade, built of white marble, was unusually impressive with the great two-story Doric Order at its base. The fact that it was in the hands of the mortgagee did not make it any more difficult to reach a successful conclusion to the negotiations for its use.

Constructed in the first decade of the century as the "Night and Day Bank," the building was extensively altered and enlarged about eight years ago. Some further structural changes were necessary: the removal of a large girder in the ceiling of the main banking room, the filling in of the rear court on the third and fourth floors, the shifting of certain stairways to improve the usefulness of the space and the introduction of additional elevators for the bank's exclusive use. The interiors from the third floor down had, with the exception of the building entrance lobby, to be completely gutted and rebuilt.

The Banking Room, planned to achieve the greatest possible flexibility not only for the present but for future expansion, has its main entrance on Fifth Avenue. The entrance from the public building lobby was rearranged at the end of this lobby, giving access to the three new bank elevators placed near the southeast corner of the building. The former entrance from 44th Street was retained, with some changes to the steps. This rearrangement produced a banking room plan which, besides answering the determined space requirements, enabled the functions of the bank to be carried out with the greatest economy of operation, full protection to money and negotiable securities, and with convenience to customers. The Public Space forms a T with the wide stem based on the Fifth Avenue entrance and the head connecting the 44th Street entrance and the elevator lobby. On one side of this stem are the bank's "valuables," paying and receiving and the security cages, connected directly to the bank's vault by the coin lift, which both in basement and ground floors is within protected area. On the other are the officers' platform and the Loan and Note Departments in direct contact with each other without crossing public space. Beyond the cross is the ladies' department, convenient to the 44th Street automobile entrance, and with its own teller's cage and rest room.

In size and arrangement, the new Banking Room provides for the needs of the present requirements. The future is provided for in two ways. First, expansion of

PLAN BEFORE
REMODELING**The
Banking
Room**

area can be obtained by moving all but three or four operating officers to the floor above into an area now occupied by clerical force, making the conference room no longer necessary on this floor. Thus, on both sides of the stem of the T, space may be created into which the enlarged departments may spread, preserving the fundamental philosophy of the present plan intact. Second, in order to assure the least inconvenience and interruption of the bank's functions while this enlargement is being made, the idea of the "movable bank screen" which we developed for the main offices of Bankers Trust was again used. This screen and also the railings are thought of rather as furniture than as permanent parts of the room, and are so designed of wood and bronze supported by tubular frames that they may be moved or extended literally "over the week end." This has been proven successful on several occasions when alterations were made in the bank's main offices.

The availability of two "flitches" of teak with exceptionally beautiful figure determined the finish of the room. It has been usual to design a room first and then select the wood to make it. Here the process was completely reversed. The size and number of the veneers controlled to a large extent the width and height of the panels both on the walls and the central piers. Moldings and cornices were eliminated, both to increase the apparent height of the room and, more especially, to enhance the beauty of the figured wood. The effect produced is one of great simplicity of design but with a richness and a quiet dignity that only a wood room can achieve.

The same wood treatment is carried out in the bank screen and railings, in the ladies' department, and in the bank elevator lobby which, through a small vestibule of green marble inclosed by bronze grille doors, leads to the building lobby.

The comparatively low ceiling height made any general indirect lighting scheme impossible. The central portion of the ceiling could, however, by some manipulation of the air conditioning ductwork, be raised about a foot which gave an opportunity for strip lighting, and this, coupled with reflectors at each end of the room, made it possible to limit the direct lighting to the two sides of the room where adequate working light was necessary. Fixtures on the axis of the main entrance were avoided. The supply of cooled and conditioned air was arranged so that the grilles became an integral part of the lighting fixture, the direction of the flow of air being controlled by vanes within the grilles. The entire ceiling is treated acoustically.

In the Basement new vaults were built, the old ones being inadequate and located outside the building line on Fifth Avenue, in fact, not only under the sidewalk

Ventilation and Lighting

Basement

DETAILS OF BANKING VAULTS



Photographs by F. S. Lincoln



Photographs by F. S. Lincoln

GROUND FLOOR
TOWARD ENTRANCE



GROUND FLOOR
TOWARD REAR OF
BANKING ROOM



DETAIL OF COUNTER
SCREEN

but in part under the roadway as well. Access to and control of these vaults was very carefully planned. The Safe Deposit Section is reached from the bank elevators through one grille door to the Outer Control and then through another, set at a right angle to protect the inner guard against hold-up, into the Inner Control opening to the vault itself. The same double protection is given to the bank vault, though on a different principle, for here the doors are bullet-proof with bullet-proof glass vision panels so that the inner guard can have visual control in case of danger. From the Public Inner Control there is access to 15 coupon rooms, each able to accommodate two people, and four large committee rooms. These are built of enameled transite partitions, for convenience in making additions or other changes. In the Bank Vault there are in the Inner Control area two large counting-rooms and in the Outer Control area the coin room, a semi-public counting-room for the



OFFICE SPACE
LOOKING TOWARD
MAIN ENTRANCE

Photographs by F. S. Lincoln



NORTHWEST CORNER OF
MAIN FLOOR with ladies'
rest room and stairway to 44th
Street at rear of photograph

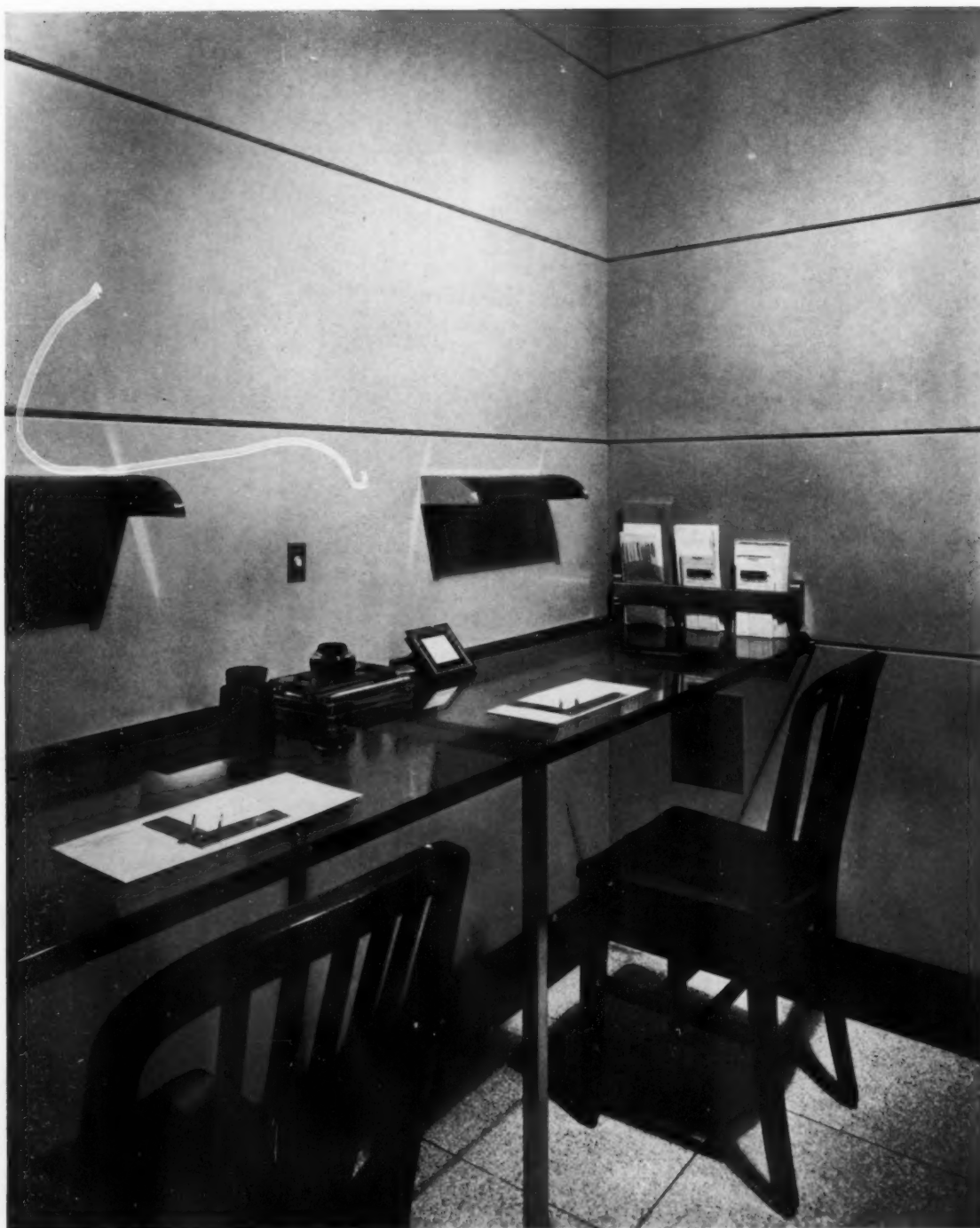


ELEVATOR LOBBY
ON MAIN FLOOR

Second Floor

delivery of securities for safe-keeping, and the security and coin lift which goes to the banking room above. Guard-rooms, toilets and locker rooms occupy the rest of the floor within the building lines and non-essentials, such as archives and other storage rooms for the bank's use, are placed under the sidewalks.

On the second floor along the Fifth Avenue side are the Trust Officers' Platform, an Office for the heads of the branch and a Board Room. These, together with a small conference room, are treated simply, with wood pilasters and dado, cornice and panel-mouldings, the whole painted green and set off by terra-cotta colored hangings. Here, except for the banking room, is the bulk of the public contact and the elevator lobby and halls are treated accordingly. The balance of the floor contains a small bond platform at the extreme east end and, between it and the Trust Platform, the trust administration clerical space so arranged that in the



COUPON BOOTH IN
BASEMENT

Photographs by F. S. Lincoln

future it may become an executive platform should need for expansion arise.

The third floor is work area except for a small section at the easterly end occupied by the administration and medical departments, and the rest rooms and toilets. This and all other floors occupied by the bank are completely air conditioned, and provision has been made for expansion to the fourth floor, in all of the essentials.

Alterations are usually the architect's nightmare, existing conditions limiting him and forcing him into unsatisfactory compromises. This building, however, was an exception, and its structural layout was such that several different schemes were possible. It became simply a matter of choosing the best. It is doubtful if "an open lot and a million dollars" could have given the bank any plan more suitable than a quarter of that sum applied to a thirty-year-old building after comprehensive study of its adaptability to the needs of the client.

**Third
Floor**

NEW TRENDS IN MORTGAGE APPRAISALS

by **Frederick M. Babcock**

CHIEF OF UNDERWRITING SECTION
FEDERAL HOUSING ADMINISTRATION

In view of the importance of the amortized single mortgage to moderate-cost private house architecture, William Stanley Parker in the April 1936 Architectural Record urged architects to "make full knowledge of financing procedures a normal part of their technical equipment." The risk rating system adopted by the Federal Housing Administration for mutual mortgage insurance is a major factor in the reorganized home mortgage market, partly because it represents advanced theory and practice in appraising and partly because it is national in scope. It has been generally accepted by lending institutions, many of which follow it without applying for insurance on the ground that an eligible mortgage is safe enough to dispense with the cost of insurance.

Mr. Babcock explains the principles of the risk rating system and sets forth some changes of detail recently introduced. These will be incorporated in the revised edition of the Underwriting Manual of the Federal Housing Administration which has just been issued. Examples of the use of grids will be found on page 286 for November 1935, although the five grids there shown have now been simplified into four.

SUCCESSFUL investment is based largely on choice of investments. In mortgage lending, the selection of mortgages presents a most difficult problem in investment technique. New devices are being introduced into the appraisal field and new concepts underlie current thought with respect to mortgage investment procedure.

In the November issue of The Architectural Record, the Risk Rating and Valuation system of the Federal Housing Administration was presented. The broad base of actual experience, including the examination of dwelling mortgages aggregating nearly three hundred and fifty million dollars, has given the Federal Housing Administration an opportunity to make a rapid advancement in the development of its risk-rating and appraisal methods. The modifications and refinements which have taken place during the last few months are impressive and

are associated with both the technical requirements and the homely practical problem of analyzing mortgage risks.

What is Risk Rating?

What is Risk Rating? Risk rating is a technique which serves two purposes simultaneously. In the first place, it provides a uniform method with which to select mortgages for investment or, in the case of the Federal Housing Administration, to determine whether or not a dwelling mortgage is eligible for mutual mortgage insurance under Title II of the National Housing Act. In the second place, it automatically classifies mortgages as to quality as investments, making possible the grouping together in the mutual insurance funds of the Federal Housing Administration mortgages having similar risk characteristics.

The essential characteristics of the risk-rating system are not new. It embraces valuation, but does not replace it. It attempts to round out the experience yardsticks that have always been used by competent lenders in securing mortgages. It has succeeded in large measure in bringing about a high degree of uniformity in decisions with respect to eligibility and quality of proffered mortgages.

The risk-rating concept has had an interesting history. The central idea of measuring hazards in connection with real estate and mortgage investments grew out of a recognition of the inadequacy of appraisals.

In 1926 or 1927 it became apparent to certain appraisers that the more significant portions of their appraisal reports dealt with the direct analysis of hazards rather than with the estimated capital values of the properties. They commenced the practice of reporting the prediction of probable net earning capacity as well as the total value and ranked the two items with equal emphasis in their official valuation certificates. Shortly thereafter, major emphasis in the analysis of projects was placed upon the relationship existing between the contemplated debt service of the proposed mortgage and the predicted earning capacity of the property. These appraisers did not recognize nor use a specific method for the measurement of risk although their processes were, essentially, an examination of mortgage hazard. The analysis presently came to include an examination which took into account not only the probable amounts of income which would be available for the payment of interest and amortization, but a qualitative consideration with respect to the certainty and probable fluctuation of the earning power. This analysis had in it the basic concept of risk examination, but did not include as yet the idea of a rating of the risk. In general, the conclusions were to the effect that the set-up either was or was not too hazardous, but did not include any attempt to say how hazardous the risk was.

During 1932 and 1933 the examination of mortgage hazard was further pursued with the idea that mortgage transactions should be "patterned" so as to deliberately reduce the amount of risk of default. It was felt that the probable amounts of future net income, the characteristics and certainty, or lack of certainty, of future incomes, the financial structures representing ownership, and similar factors should be reflected directly in the provisions made for

amortizing payments and other provisions of the loan transaction.

There appeared to be the possibility of introducing greater flexibility into the requirements for prepayments so as to increase the amounts of the payments automatically during good times and to reduce the obligation for payments during bad times. The strength of this suggestion lay in the fact that the combination of both a quantitative and a qualitative analysis of earning capacity in a property permitted the deliberate patterning of a loan transaction so as to reduce hazard. It was obvious that no amateurish treatment of the idea would lead to the development of a suitable technique. It was recognized that the use of such a device in connection with the lending of mortgage funds was closely related to the selection of proper rates of capitalization in the appraisal of income properties and rates of mortgage interest. Further consideration has been given to the application of the risk-rating or patterning idea in connection with income-producing properties since that time. The Federal Housing Administration found it necessary and desirable to utilize the same line of thought as a solution of its appraisal problem. It was recognized that the inherent inaccuracies of appraisals were seriously increased at that time due to circumstances in the general economic structure. Appraisers throughout the country were frankly admitting that there were few criteria on which they could base their estimates. There was little construction, few sales, and a demoralized rental market. It was apparent that the Federal Housing Administration would make a fatal mistake if the issuance of its mortgage insurance were based solely on attempts to appraise dwelling properties. Risk rating was the available solution.

The National Housing Act was a perfect vehicle for the purpose because:

- (1) The Act permitted a relatively high percentage mortgage (80%), thereby making the selection of risks by effective means an essential and vitally important factor.

- (2) The Act said that loans must be "economically sound." This meant that simple formulas and rules of thumb could not be relied on with safety.

- (3) The Act required mortgages to be grouped according to similar risk characteristics. By strange coincidence this phraseology virtually constituted a mandate to the Federal Housing Admin-

istration to install some system of mortgage risk rating.

(4) The operations of the Federal Housing Administration were destined to include a large number of similar properties which would permit the risk-rating technique soon to be subjected to statistical examination. This type of verification of methods would have been a slow process in the income-property field.

The Federal Housing Appraisal Problem

The problem confronting the Federal Housing Administration in the summer and fall of 1934 was really a very difficult one. It was necessary to find a way of specifying, describing, and determining whether or not mortgages were eligible for mutual insurance under Title II. Appraisals alone could not fill this need. It was necessary to find a way to group mortgages according to risk. At the same time the unit (a typical mortgage of three or four thousand dollars) was so small that no elaborate or complicated system was permissible. The plan had to be reduced within practical limitations before it could be installed. Finally, the system had to be of such a nature that it could be placed in practical operation with the utmost speed by a newly assembled staff of men unfamiliar with the risk-rating line of thought.

It might have been possible for the Federal Housing Administration to avoid the real issue. This was not done. Real estate is an exceedingly complex commodity. Simple formula appraisals would have been possible, but would have represented a return to the Dark Ages of technical practices and would have had the effect of putting government approval on lending practices known to be unsound. The Administration had to introduce a technique into the field for immediate use. It is interesting that the methods adopted have worked out during the first year and a half in a most satisfactory manner.

The risk-rating system which was installed is now understood by a large number of people in the country. Immediately rejected in the new method was the traditional habit of relying primarily on valuations. The ratio of the loan to the value was recognized in the system as one of the most important clues to the amount of risk, but it was not accepted as *the* measure of risk.

The reason why valuations are not acceptable as

the sole measure of risk, insofar as security is concerned, are few, but important. Valuations at best are relatively inaccurate. With the use of the best available techniques by an honest appraiser of good judgment, the appraisal which is produced is an opinion supported by certain data. At present it is self-evident that great precision is not possible and that the best appraisals can still be accepted as accurate within a considerable zone between minimum and maximum estimates.

Valuations, as measures of risk, are of significance only when the loan-value ratio is examined. It is pointed out by the Federal Housing Administration that the loan value ratio does not embrace all the elements of risk involved in the making of a mortgage loan. It is self-evident that the term of the loan and the ability of the borrower to pay are factors which do not enter into the loan-value ratio. It may also be pointed out that there are numerous characteristics of properties and locations which affect risk, but are not properly measured when reduced to the common denominator of an appraisal.

The use of the loan-value ratio removes the analysis from the actual place where risk may be observed and considered. And, of course, there was the remaining factor, already mentioned, that valuations, during 1934 and 1935 especially, could not be expected to have primary significance or satisfactory accuracy. Therefore, the Federal Housing Administration accepted the principle that the measurement of mortgage risk was the solution of the problem and that risk had to be recognized as an entity capable of such treatment.

Nature of Mortgage Risk

Mortgage risk is always present when a mortgage is made. For the purpose of risk rating it is simply necessary to recognize the presence of risk in different degrees in different mortgages. It is fallacious to presume that mortgages fall into two classes: those that are safe and those that are unsafe. Each and every mortgage investment is hazardous in some degree. Different mortgages vary as to the degree of hazard.

Mortgage risk lies in the future. We cannot know much about absolute risk. We are dealing with probabilities. Therefore, the best we can hope to do in the rating of mortgages according to risk is to attempt to determine the relative risk from case

to case. This is the same as saying that risk may be expressed only in terms of predicting "chances" or likelihoods as seen from the present time.

Mortgage risk may be conceived of as an entity and may be treated as such. This is essential in order to make it possible to express a measurement of risk in simple terms. As an entity the over-all degree of hazard is composed of all the possibilities of trouble, expense, and loss in connection with the lending of mortgage funds. In other words, risk includes: Difficulty in connection with collections, unusual expense in connection with collections, excessive servicing costs, likelihood of foreclosure trouble, cost of foreclosure, delay in foreclosure, cost of rehabilitation, cost of carrying until sold, cost of resale, and loss on resale. The over-all degree of risk is necessarily associated with the relative degrees to which there is likelihood of troubles and financial losses such as those listed above. It might be possible to include in the list the depreciation of values of neighboring properties securing loans, owned by the same investor.

The above list indicates the specific form of risk. It does not, however, list the elements which contribute to and affect mortgage risk. These factors are numerous, complex, and subject to an almost infinite number of possible combinations in practical cases.

Included among the elements which contribute to risk are the wide variety of neighborhood and location characteristics. Different types of cities create different kinds of residential neighborhoods. An almost infinite number of factors affect the probable future trends of districts and the values of the homes in them. Some are more stable than others; some may be expected to have longer attractive lives than others. In making a list of the factors which contribute to risk it is necessary to recognize the great variety of architectural styles and designs. They have differing probabilities with respect to structural durability. They will be acceptable in future markets in widely differing degrees. Different methods of dwelling construction, different room arrangements, different sizes of houses, and different provisions for mechanical equipment introduce different degrees of mortgage hazard.

One of the most important groups of factors which affect mortgage risk is that which embraces the relationship between the physical property and

the neighborhood in which it is located. Marketability is a basically important characteristic of a good mortgage loan. Different degrees of marketability represent different degrees of mortgage risk. There are varying degrees of conformity and non-conformity between neighborhoods and houses and these must be taken into account in listing the factors which contribute to mortgage hazard.

Also included are all of those elements of risk associated with the earning power of the prospective borrower, his ability to pay, his attitude toward obligations, and his prospects for the future. In the final analysis the probability that a borrower is able and intends to pay the mortgage debt represents the first line of defense against trouble with the mortgage investment. Therefore, a poor borrower, when considered in relation to the mortgage transaction, requires a low rating of mortgage risk. At the same time, a good borrower cannot go very far toward replacing the necessity for sound physical security in the real estate itself.

Measurement of Mortgage Risk—Essentials

In the attempt to develop a system which results in an over-all measurement of mortgage risk, certain essentials must be included. In the first place, the system must deal with many complex elements of risk. It must actually classify mortgages according to relative risk. It must be relatively simple. And, finally, it must result in uniform decisions in the hands of different competent men.

Considering the first requirement, namely, that the risk-rating system must deal with the elements of risk, it is apparent that there are not only many elements which may combine into an unlimited number of patterns, but that they are significant solely as probabilities and are interrelated and capable of treatment by groups.

The requirement that the system must actually classify mortgages according to relative risk does not include the necessity for any sort of absolute rating. What is required is that the resulting measurements must be correct insofar as is humanly possible in terms of their relationships with one another. In other words, the rating system should be able to arrange several hundred dwelling mortgages in rotation according to their probable relative degrees of risk, but it need not express the specific hazard involved in any absolute manner.

It is also necessary to have a system which is

relatively simple. Otherwise it cannot be used effectively by a field staff. Furthermore, in dealing with dwelling mortgages, it is evident that any elaborate or cumbersome technique will prove to be too costly. The system must be one in which it is possible to make a forthright, direct analysis of mortgage risk with reasonable dispatch.

Finally, the system must result in uniform findings and consistent decisions. It must be a system by means of which different men working in different parts of the country will arrive at substantially similar answers. This would indicate that there must be some bench-marks as integral parts of the system in order to control the over-all range of the judgments of the men who apply it.

Measurement of Mortgage Risk—Methods

The Federal Housing Administration developed such a method and introduced it into its operations in the fall of 1934. Since that time the original method has been subjected to careful scrutiny with a view to polishing and refinement. At the present time the Federal Housing Administration is engaged in introducing certain simplifications all of which improve the technique of risk rating. They are not radical and do not represent any fundamental change in the general method of determining mortgage risk.

When the risk-rating system was originally devised, it was found that certain elements of risk were incapable of intelligent rating. For example, if an attempt is made to rate a house according to the number of baths, no satisfactory clue is possible because such a factor is not ratable. It cannot be done unless the valuator relates the number of baths to the requirements of the local market and the size of the house. However, when he is asked to rate a factor such as the adequacy of bath facilities he is able to form a very definite conclusion. Such a relationship is ratable.

Hence the Federal Housing Administration risk-rating system involves the ratings of a series of relationships. It does not rate the income of the borrower. Instead, it rates the ability of the borrower to pay the debt service. That is, the judgment of the examiner is applied to the relationship existing between the borrower's income and the debt service of the contemplated mortgage. Again, it is impossible to rate the presence of transportation, but perfectly possible to rate the "adequacy of trans-

portation."

Each of the relationships considered is called "a feature of risk." For practical purposes, the number of features has been reduced down to 28. The selected 28 represent relationships which are sufficiently different from and exclusive of the other features so that an architect or valuator can form an intelligent independent judgment in connection with any of them. In the aggregate, the 28 features embrace all of the most important elements of risk involved in the making of a mortgage loan on a dwelling property.

The features are grouped, for convenience, into four general categories of risk, including:

The Property.....	8 features
The Location.....	9 features
The Borrower.....	5 features
The Mortgage Pattern.....	6 features

Each feature is rated by inserting an "x" mark opposite it in the grids which are contained in the underwriting forms of the Federal Housing Administration. In connection with any one feature, the underwriter has the option of placing the "x" mark in any one of six columns, headed respectively: "Reject - 1 - 2 - 3 - 4 - 5."

If his analysis of a condition of relationship with respect to any one feature indicates the loan to be too hazardous to be acceptable, he places the mark in the "Reject" column. One such "x" mark in a reject column is sufficient reason to declare the entire proposal unacceptable for mutual mortgage insurance. If, however, the circumstances found in connection with a given feature are above minimum requirements, he forms a judgment with respect to the degree of hazard and places his "x" mark in one of the other five columns. Highly dangerous conditions require the "x" mark to be placed in the "1" column. Superlatively excellent conditions call for a mark in the "5" column. Typical conditions introducing only a usual degree of hazard result in a mark in the "3" column.

Upon the completion of the rating of the individual features, summaries of the results found in each of the four general categories of risk are made. For illustration, in rating the location the valuator will have placed nine "x" marks in the location grid. If none of these occur in the reject column he carries the small figures or "weights" to the right-hand column and adds up the weights to secure a figure

representing "Rating of Location." The weights are so arranged that the sum of the weights in the "5" column is 100%. The rating that he may secure will be somewhere between 20% and 100%. In those instances where the resulting rating is less than 50% the mortgage is declared ineligible for insurance.

Thus there are two bases upon which a loan may be rejected. It may be rejected because of a reject rating of a single feature or it may be rejected because of a rating of less than 50% in one of the four categories.

Because the relative importance of the categories differs from case to case the fourth category, namely, the Mortgage Pattern, includes a device by means of which to take account of this relationship. The resulting determination with respect to the eligibility of the loan is given by the final rating of the Mortgage Pattern.

Control of Mortgage Risk Measurement

The experience of the Federal Housing Administration has demonstrated an unexpected degree of consistency in the risk ratings applied to cases throughout the entire country. It was originally expected that there would be a decided amount of inconsistency in the results obtained. It was expected that the inconsistencies would not be serious, but that they would be sufficiently pronounced to be disturbing. With very few exceptions, a high degree of consistency has been obtained.

The general problem of controlling the judgment of the men who apply the system is, therefore, not a major problem as long as they belong to the same organization. That is, the employed staff members of the Federal Housing Administration, due to their

regular business contacts with other members of the staff, seem to produce similar risk ratings of similar properties. However, inconsistency does appear in those instances where other agencies have employed the risk-rating system. It is, therefore, highly desirable to introduce some degree of control in the system of mortgage risk measurement.

The application of specific arbitrary rules is generally to be avoided as criteria in the application of risk rating. They tend to become too arbitrary and do not work well except in the form of minimum requirements in connection with certain features in the rating system.

Why Risk Rating?

Risk rating has won its spurs. It has been found to serve a significant group of purposes and to integrate practice on a uniform and sound basis. It offsets the deficiencies of valuation. It provides a non-arbitrary criterion of eligibility. It produces, as a by-product, a logical classification of mortgages according to risk.

It provides the basis for the many comparisons which are required to make a proper appraisal of dwelling properties. It bridges the gap between the real estate research problem and the appraisal problem because it gives point to research projects. It provides a national yardstick by means of which to apply uniform analyses of mortgages. It furnishes a motivating force which induces builders to construct better properties. It is sufficiently flexible to apply to all types of properties and at the same time it does not delay the introduction of innovations in design. Finally, it permits the control of mortgage investment policy through the agency of a technique for qualitatively describing mortgage portfolios.

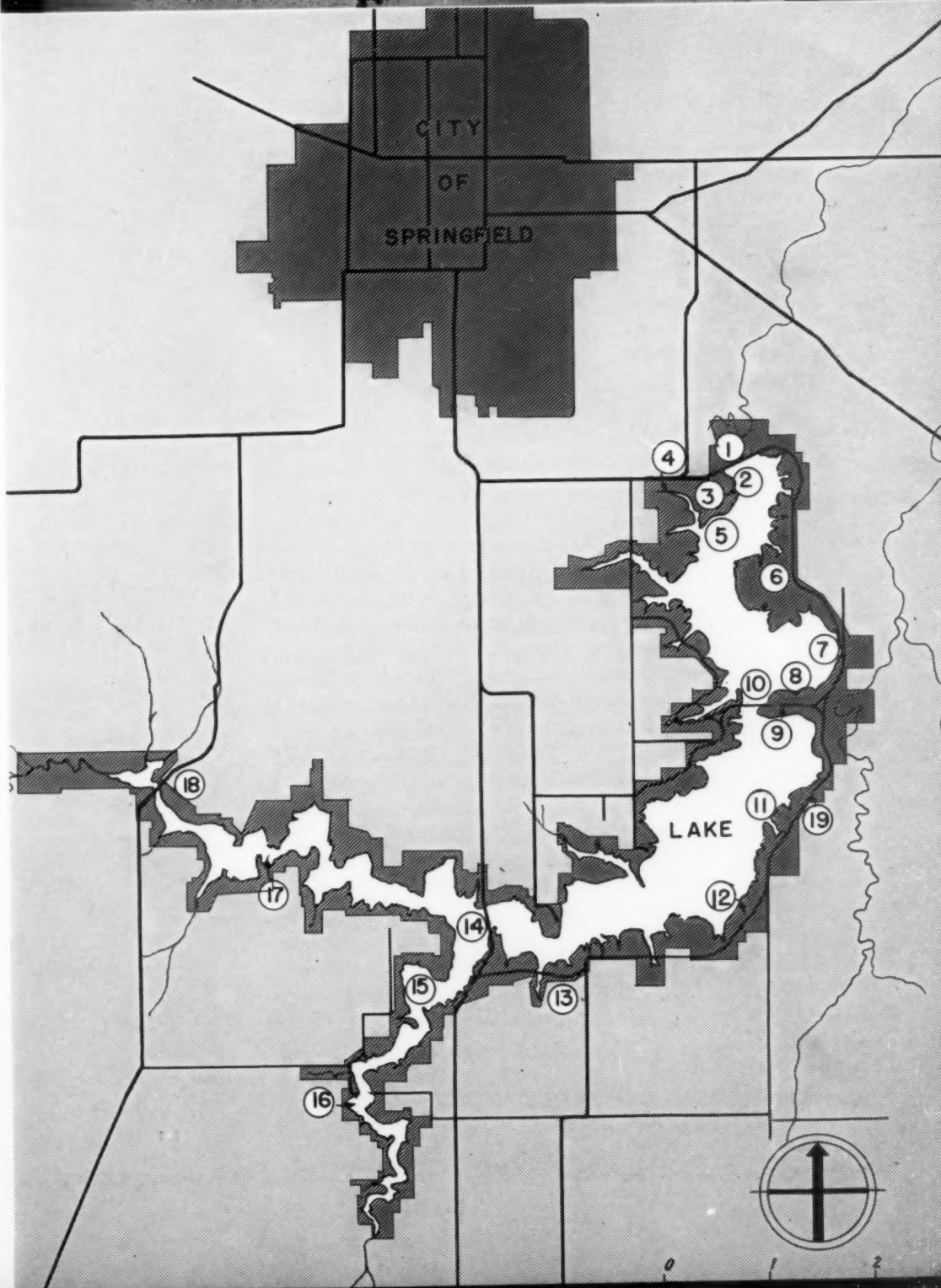
LAKE SPRINGFIELD DEVELOPMENT

SPRINGFIELD, ILLINOIS



Plot Plan — showing relation of project to city:

1. Spaulding Dam
2. Lakeside Power Plant
3. Lakeside Water Plant
4. Nursery
5. City Boat and Barge Dock
6. Proposed Golf Course
7. Dividing Dam
8. Lake Park
9. Beach and Beach House
10. Lindsay Bridge
11. Cottage Grove Park
12. Lincoln Gardens
13. Cotton Hill Park
14. New Highway Bridge
15. Wild Life Sanctuary
16. Glassier Bridge
17. Lick Creek Bridge
18. Highway Bridge
19. Sunset Place



A successful tradition of public ownership made it possible

Most cities have reservoirs, natural or artificial; but few of them show a proper recognition of their possibilities over and above that of furnishing an adequate water supply. The new city reservoir of Springfield, Illinois, is an outstanding exception to such a rule. Beginning in 1925 as a plan to supplement its water supply from drilled wells, the city of Springfield has developed a lake of 4,270 acres surrounded by 60 miles of shore line and 4,200 acres of park and controlled residential area. It has re-planned an entire rural area south of the city limits, rerouting existing roads, constructing new bridges, dams and a power house. It acquired, cleared, developed, and is now leasing the land occupied by the lake and its marginal developments. It has achieved all this, moreover, within the limits of time and cost set in its original plans.

A project in community planning such as Lake Springfield is only possible where a definite precedent for public ownership and control exists. Springfield, Illinois, a small city of 75,000, has for the last twenty years owned and managed its own water, light and power department; "this Department of Public Property has been and is operating on a very efficient basis, giving the consumers electric and water service at low rates, besides being able to expend its municipal development to the extent of building this unusual project."* Only with this successful tradition behind it was it able to plan and execute a project of this scope.

Since this project was primarily one of increasing the city's water supply, it was obvious from the first that the city would have to retain control of the lake shores for sanitary reasons. At the same time it was planned to make the recreational benefits of the reservoir fully available to the residents of a mid-western city far removed from any large bodies of water. Facing this task, an extraordinarily complete plan for the physical development of the marginal land was evolved. With this plan was evolved a system of control—leasing, zoning, and plans for further development.

The project pays for itself

In 1930 the Lake Springfield project was presented to the voters in the form of a \$2,500,000 bond issue. The proposition was complete in all details, being only one of some fourteen alternate projects which the city had engaged two firms of consulting engineers to study. A complete financial program was presented at this time. It was estimated that annual surpluses of the Water Department (\$136,694 in 1935) would carry from a minimum of one-half to a maximum of four-fifths the amortization charges; any balance to be raised by general taxation. However, special attention was given to the subject of marginal land development and its effective use to carry a part of the financial load. Myron H. West, of Chicago, was engaged to develop a plan for providing a definite income from this area by properly utilizing it for lake-side residences, recreation centers, parks, etc. Up to date, all charges have been met with no taxation.

After the bond election immediate action was taken to purchase the lake site. "The main Dam, named for Willis J. Spaulding, Commissioner of Public Property, is located approximately three miles from the city. The lake in its entirety lies in southerly direc-

* See 18th and 19th Annual Reports. Water, Light and Power Department, City of Springfield, Illinois.



A large lake now covers the fat Illinois farm land



This dam guarantees adequate water for a city of 300,000



The scale of the arches was varied for architectural effect



One of six new bridges necessitated by the project

tion and is in general approximately six miles distance from the city. Approximately 110 tracts of 8,500 acres, controlled by 107 owners, were involved. Considerable opposition was at first encountered. The lake site lies in a highly developed farming area and some of it was still owned by families who had originally acquired their holdings from the government."

Land values aren't scientific

An attempt was made to purchase large blocks of land by bargaining with groups of owners rather than with individuals. It was proposed that a soil survey be made of the area and that the fertility of the soil thus determined be the basis of the fundamental value of the land. The value thus determined was then to be modified to account for the proximity of the tract to paved roads or to the City. The value of all improvements was to be added to this as well as any severance damages or going concern value. The method was enthusiastically endorsed. Over two-thirds of the land to be acquired was thus surveyed and evaluated, with the result that the value set always seemed right for the other fellow's land but only in rare cases did the value placed on a tract suit the owner of that tract.

This method of bargaining was soon abandoned and individual negotiations established. One field man was employed on this work almost continuously for two and one-half years and purchased approximately 8,500 acres of land. Eleven bona fide condemnation suits were filed of which only three were contested. Ten other friendly suits were tried to clear title.

After a large share of the land had been purchased, clearing operations were begun. This work was largely completed during the winters of 1931-32 and 1932-33. The entire flooded area of 4,270 acres was cleared. Suitable timber was sawed into lumber and either used on the project or sold. Waste wood was cut to convenient size for hauling and was given away.

Work begun: 30-hour week, prevailing wage

The entire clearing operation was done by an organization established by the Department of Public Property of the City and was conducted as an unemployment relief project. All equipment, including tractors, was purchased by the Department. Labor gangs were well organized and worked a 30-hour week at the prevailing wage scale. The cost of clearing averaged \$40 per acre of flooded area.

Parallel with clearing operations was a large construction program of physical changes made necessary by the project and subsequent improvements growing out of it. Two dams were constructed to impound the water. Six new highway bridges were completed. One railroad bridge was reconstructed. Twenty-five changes were necessary in existing highways, including the re-location of seven miles of State Route 126. Numerous changes were made in telephone and power lines. Twenty-five miles of new marginal roads were constructed. Approximately eight miles of sewers to serve the marginal area of the lake have been completed. Municipal water lines and light and power service serve the region. A large bathing beach and bathhouse were constructed. Numerous items of bank protection in the form of riprapping have been completed. A large nursery has been established, and now contains over 300,000 young trees, consisting of native hardwoods and conifers which will be used for reforesting denuded areas. A definite plant-

LAKE SPRINGFIELD DEVELOPMENT

ing plan for the marginal area is now in operation.

The plan did not originally include the immediate construction of a purification plant and electric pump station but, because of "the offer of money at low interest rates and due date after all lake bonds were paid off and the fact that a \$500,000 addition to the Electric Power Plant was imperative," the plant was constructed as an integral part of the project.

In general, marginal roads were located back from the shore line in order to permit platting all lots with a water front. Certain locations are reserved for large estates while more modest developments are provided for elsewhere.* Because of sanitary requirements, the lower section of the lake extending approximately one mile upstream from the water works intake is zoned for restricted use. In the upper section the lake area and the marginal land is restricted only in a nominal way.

At Recreation Point, located near the center of the lower half of the lake, a park center has been developed for bathing, boating and other water sports. Baseball, tennis and golf facilities have also been provided for. This use of the area is considered consistent with the most efficient sanitary control of the area.

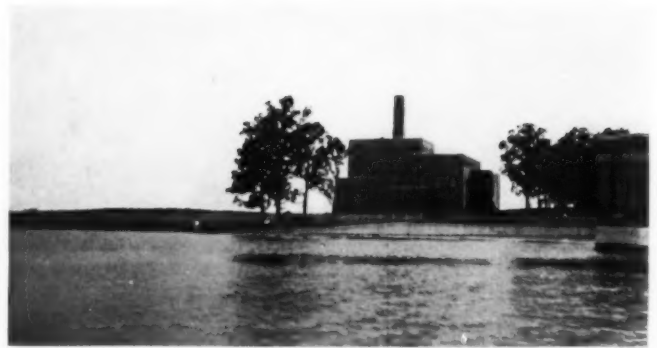
The principal source of revenue from the marginal and recreational development of the lake comes from the leasing of the shore for residential purposes. Although planned as a summer colony 75 per cent of the residential development to date is permanent because of the ease with which city facilities such as water, light and sewerage can be provided. There are now over 100 tracts leased and more than one half have dwellings and cottages thereon, and more activity is anticipated in the building of homes and cottages. There are 1,000 acres in parks and in the Wild Life Sanctuary. Land is leased on long-term leases. Complete restrictions as to the character of construction have been imposed in order to preserve land values and protect building investments. Control and development of Lake Springfield to its fullest extent has been assured through municipal ownership of the marginal land, and already a comprehensive plan of improvement is under way so that in years to come the lake will retain all its initial attractiveness as a residential district and recreational area.

Private ownership would make control impossible

Realizing that private ownership of the shore land would frustrate attempts at adequate lake protection, thwart any comprehensive plan of improvement, and hinder the development of recreational values, the city procured the passage of an act of the legislature permitting the making of leases for not to exceed sixty years to persons of good reputation and character.

In preparing the form of lease, care was taken to include only such provisions as would be desirable from the viewpoint of those lessees who wished to improve and maintain the premises as home sites. Accordingly, the lease contains many clauses, not found in the restrictive covenants of real estate subdivisions, giving the lessee substantial rights calculated to encourage the development of the area for permanent all-year homes and to maintain a high-class neighborhood with maximum privacy. To this end a provision has been made to exclude the general public not only from the leased tract but from the waters of the lake within one hundred feet from the shore line, and an ordinance was drawn up to limit

*More than sixty per cent of the marginal land will be reserved for use by the general public.



A \$500,000 power and water plant is part of the project



A large beach and modern bathhouse where corn once grew



Springfield now goes sailing

SPRINGFIELD, ILLINOIS



Speeders are warned: 5 m.p.h. within 400 feet of shore



One of the many year-'round residences on the lake shore

the speed of boats within 400 feet of the shore to five miles per hour.

Group leasing of adjoining tracts of land by friends has been encouraged through a provision that, in the case of the sale of a leasehold to one not a relative of the seller, the neighbors shall have the option to substitute their own nominee either at the proposed price or at an arbitrated figure.

Any proper determination of the amount of rent or sale price for leaseholds and the time and manner of payment must take in consideration the need for and the use to be made of the money. Large expenditures are required to install the various public services and improvements necessary to make the shore land available for modern homes. If these services such as water, sewer, electric lines, roadways, trails, parks and public lands in the environment of the home site are to be maintained and further improved, the city must have a constant and dependable source of income available for such purpose throughout the term of the lease.

Thus the price of the leasehold has been divided into two parts—one, an immediate payment into capital costs, and the other, a continuing contribution to a maintenance fund. The form of lease adopted carries a plan of payment, based upon the estimate that three-fourths of the price for the whole term will be required during the first nineteen years of development. To make such improvements the city needs and must obtain as soon as practicable this three-fourths of the price for the whole sixty-year term; and to obtain it promptly a 10 per cent discount is allowed for immediate payment.

The remaining one-fourth of the sale price for the entire sixty years will be required to maintain such public services as roadways, etc., and to police and care for the neighboring public lands. This part of the sale price is not subject to prepayment but must run through the entire term, and for convenience is fixed as a sum equal to six per cent on such remaining one-fourth of the sale price, without ever requiring payment of the principal sum.

That part of the development used for residential purposes is zoned to permit different price classes and different sized properties. "The price of lots ranges from \$50 a year up to \$224 a year; of course, after 19 years have expired the payments reduce to approximately one-fifth of original payments." The minimum price limitation on houses runs from \$1,000 to \$6,000. Plans for all new structures must be approved by the City Commission. Restrictions as to size and location of buildings guarantee against adverse influences in the future.

Credit as well as cash

While immediate payment of three-fourths of the sale price of the leasehold would be the ideal arrangement to enable the city promptly to make improvements to serve the home sites, yet such a requirement under present economic conditions would prevent many very desirable persons from acquiring leaseholds. The city has therefore adopted a credit, as well as a cash plan. On the credit plan three-fourths of the price is paid in installments, extending for nineteen years, but with the privilege of prepayment and conversion to the cash plan at any time in accordance with a liberal discount table printed on the lease. On the cash plan the three-fourths price is paid in a lump sum, less 10 per cent discount. On

either plan the remaining one-fourth of the price or maintenance payment runs in quarterly installments throughout the sixty-year term.

To illustrate—on a \$1,000 site, under the credit plan, three-fourths (or \$750) must be paid in 19 years with interest figured at 5 per cent. This is equal to a down payment of \$70 and \$44 per year thereafter in quarterly installments for 19 years. The remaining \$250 is never paid but in lieu thereof a maintenance payment of \$15 per year is required throughout the whole term, resulting in a total payment of \$70 per year for 19 years and \$15 per year for the remaining 41 years of the sixty-year lease, all in quarterly installments.

Under the cash plan the down payment would be \$750 less 10 per cent discount, or the net sum of \$675, and thereafter \$15 per year in quarterly installments during the entire term of the lease. When not in default, a lessee may at any time remove his improvements or may surrender or sell his leasehold and be relieved of all future liability. He may also mortgage his improvements and leasehold in like manner as long-term leaseholds in cities are commonly mortgaged. At the end of the sixty-year term the lessee or his family has the preference in renewing the lease. As a practical matter, after a substantial part of the term has run, the lease may be surrendered and a new one made for 60 years from that date on then prevailing terms.

This development illustrates the possibility of intelligent planning in community problems. From the plot plan it is apparent that the Department faced a number of problems, not the least of which was the adaption of a very irregular development to the rectangular platting pattern so typical of this part of the midwest. The size and shape of the development were necessarily determined by the topography of the lake site. The acreage of the land had to recognize the limitations of rectangular platting; and a new system of drives surrounding the lake had to be tied into the existing road pattern; moreover, several important highways had to be re-routed with the construction of the lake.

Despite these limitations, the finished project is well integrated with the already-determined pattern of the community. The project is served by existing schools in the neighborhood and various shopping communities are available at different points. Bus service to the city is already available. The roads, both finished and projected, are of a permanent character with loose gravel finish. They are maintained by the township and county to which the residents of the project pay taxes. The park system, which constitutes over 60 per cent of the total marginal area, is maintained by the city. The entire area is policed by the city and fire protection will be available from the municipal water system. After the lessee or custodian completes a home, then it becomes subject to township and county taxes. Home owners on lake property at present vote as township residents. This probably will be changed in the future.

The entire development of the Lake Springfield project has been from the start under the direction of Willis J. Spaulding, Commissioner of Public Property, Springfield, Illinois. The original engineering studies for the project were made by him. Major construction work was under the direction of the Burns & McDonnell Engineering Company. Myron H. West planned the development of the marginal land.



The lake is well stocked with fish



The City Boat and Barge Dock is popular

PORTFOLIO

CURRENT BUILDING TYPES



Photograph by de Jongh

NEW FIELD HOUSE

SWARTHMORE COLLEGE, PENNSYLVANIA

WALTER T. KARCHER AND LIVINGSTON SMITH, ARCHITECTS

ROBERT E. LAMB, DESIGNER

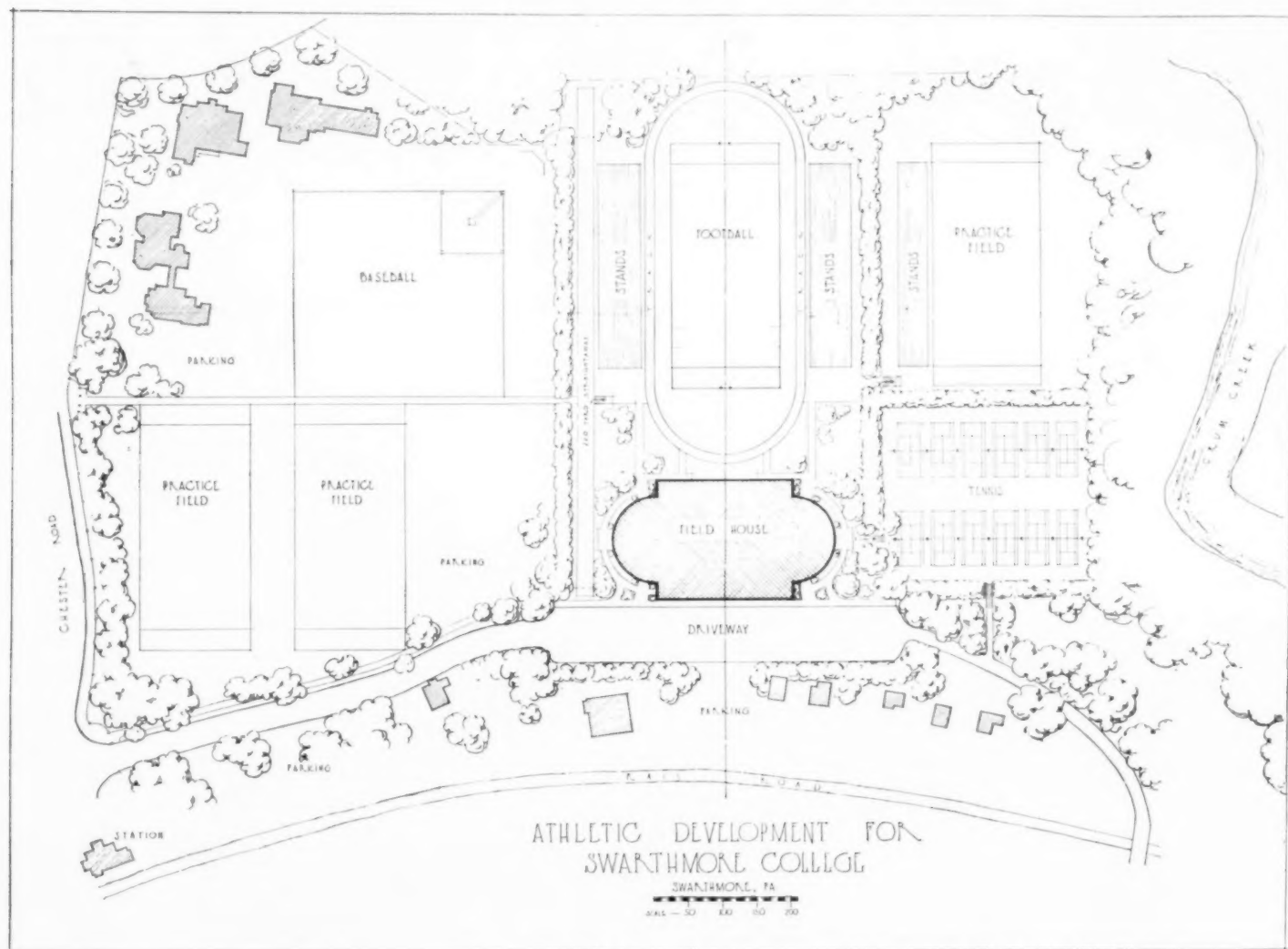
The new Field House at Swarthmore College is "modern," both in plan and in exterior, not because this staid, conservative college has any reason to advertise its wares or to catch the eye by an unusual picture, but rather because the radical plan of the new building represents a strictly logical solution of the problem it was designed to solve. This old Quaker College, nestling in the rolling hills near Philadelphia, has stressed the doctrine that though past conclusions must be learned and digested, it is by this very process that new thoughts, more valuable because of their legitimate parentage, will be produced. Expression of the new thoughts will take its own sane form when the basis is solid.

Swarthmore has no need or desire for the stadium effect, but has instead stressed outdoor sports in natural surroundings. Comprehensive plan studies were made several years ago for the future campus development. More space was needed for college buildings as well as additional fields for athletic sports. Accordingly, in developing the comprehensive

plan here shown, advantage was taken of other college land to the south of the campus. The new tract required careful study as the ground was quite hilly and uneven. However, this extreme contour variation was turned to advantage, for three major levels were determined on, and the result produces a most unique and unusual athletic field development.

On the highest of these three levels were located the baseball field and two practice fields for lacrosse, football, hockey and other outdoor sports. Plenty of space for parking was found. Five feet lower was placed the football field while the Field House was kept to the upper level, with its cross axis on the field. Ten feet lower than the field were located the tennis courts and another practice field. From the level of the courts the ground drops off rapidly through the woods to the beautiful Crum Creek.

This disposition of levels based on the economic use of cut and fill will produce an unusual result. The slope of the





Photographs by E. V. Wenzell

ENTRANCE DETAIL

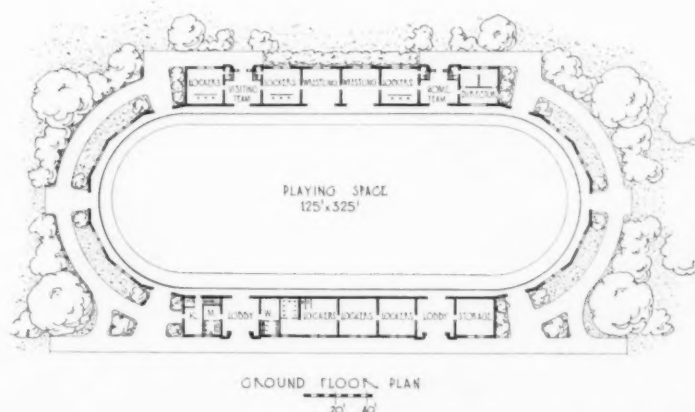
terrace on the east side of the field will produce a natural grandstand—the permanent grandstand will be on the west and the whole field and Field House will be surrounded by trees. This latter is made possible by an endowment from Scott Foundation for horticultural study and landscape development. One phase of this operation has been the continuous planting of trees and foliage about the College buildings and campus, so that the atmosphere of the whole group will have little in common with the usual cold college athletic set-up.

A great deal of study and experimentation were devoted to development of the exterior concrete walls. Concrete was used for economy, but the last thing desired was the usual typical gray uninteresting wall or a painted surface. The strong horizontal lines in the external walls were obtained by inserting wood strips in the forms, but for the forms it was decided to use four-foot wide boards of plywood, care being used to stagger accurately the vertical joints. This latter point was important, for while these vertical joints are relatively small they give an heroic scale to the wall. The surface of the concrete was left as it came from the centering. Extreme care, of course, was required in the pouring.

Color here seemed to be out of the question when the cost of the manufactured pigment was considered. But after weeks of experimenting, with the assistance of Mr. McMullin, Research Engineer of the Cement Manufacturers' Association, a simple method was developed and used. Instead of a manufactured pigment that could not be afforded

there was discovered within trucking distance a highly colored clay; experiments developed the formula for the mix and a rich pink buff integral color was obtained with very little quantity of the clay and no detriment to the strength of the concrete. The result was highly successful. The same color was used throughout the interior concrete walls as well. For the roof covering of felt, a rich maroon was selected and the same maroon was used for painting the few bits of wood or metal on the exterior.

The result of this intensive study was a building that cost approximately ten cents a cubic foot.

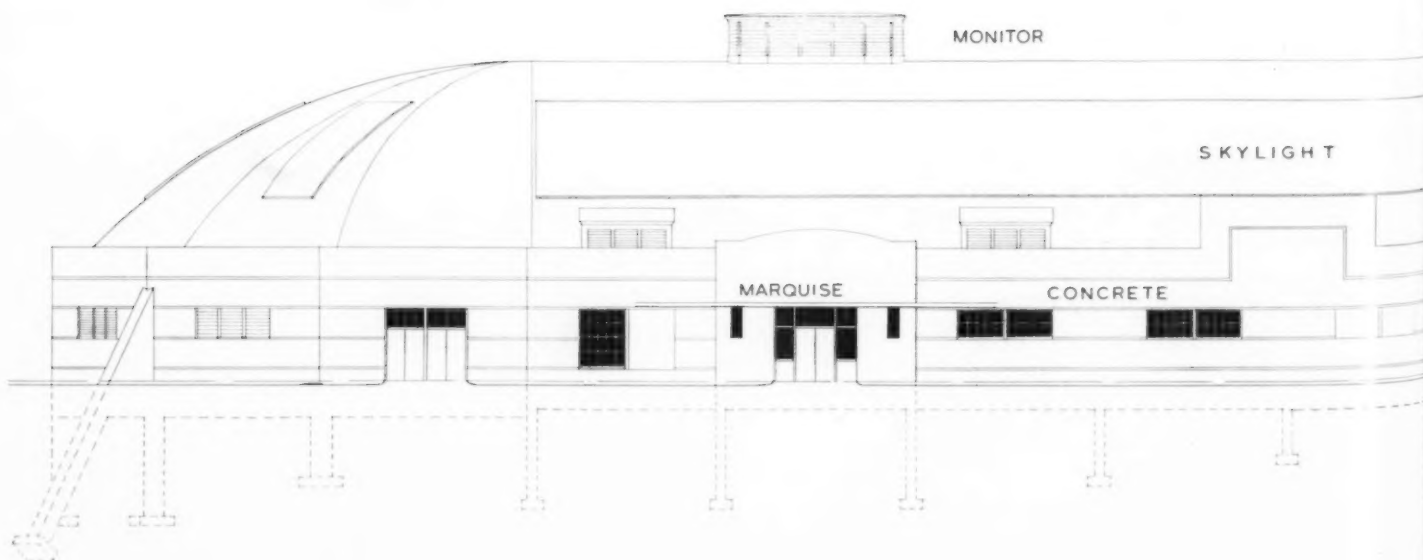




Photographs by E. V. Wenzell

FIELD HOUSE

SWARTHMORE



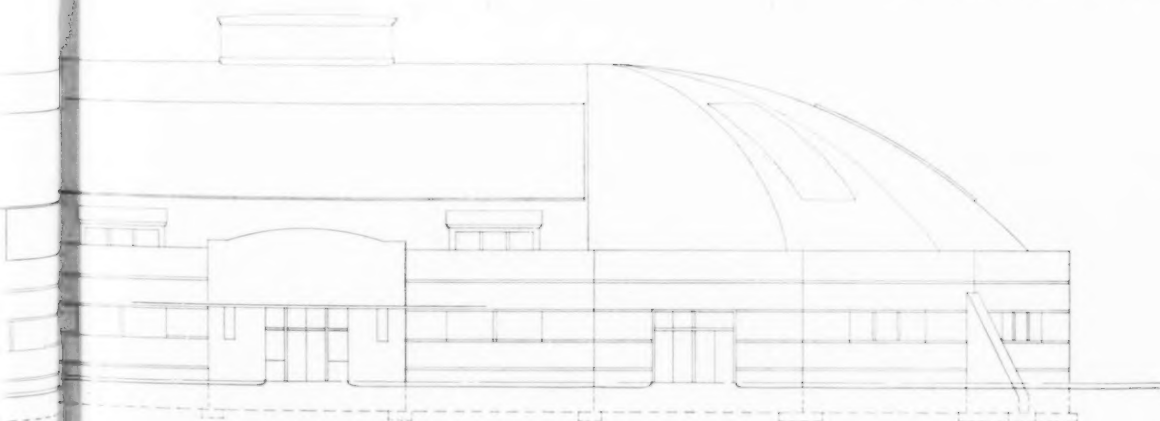


COLLEGE

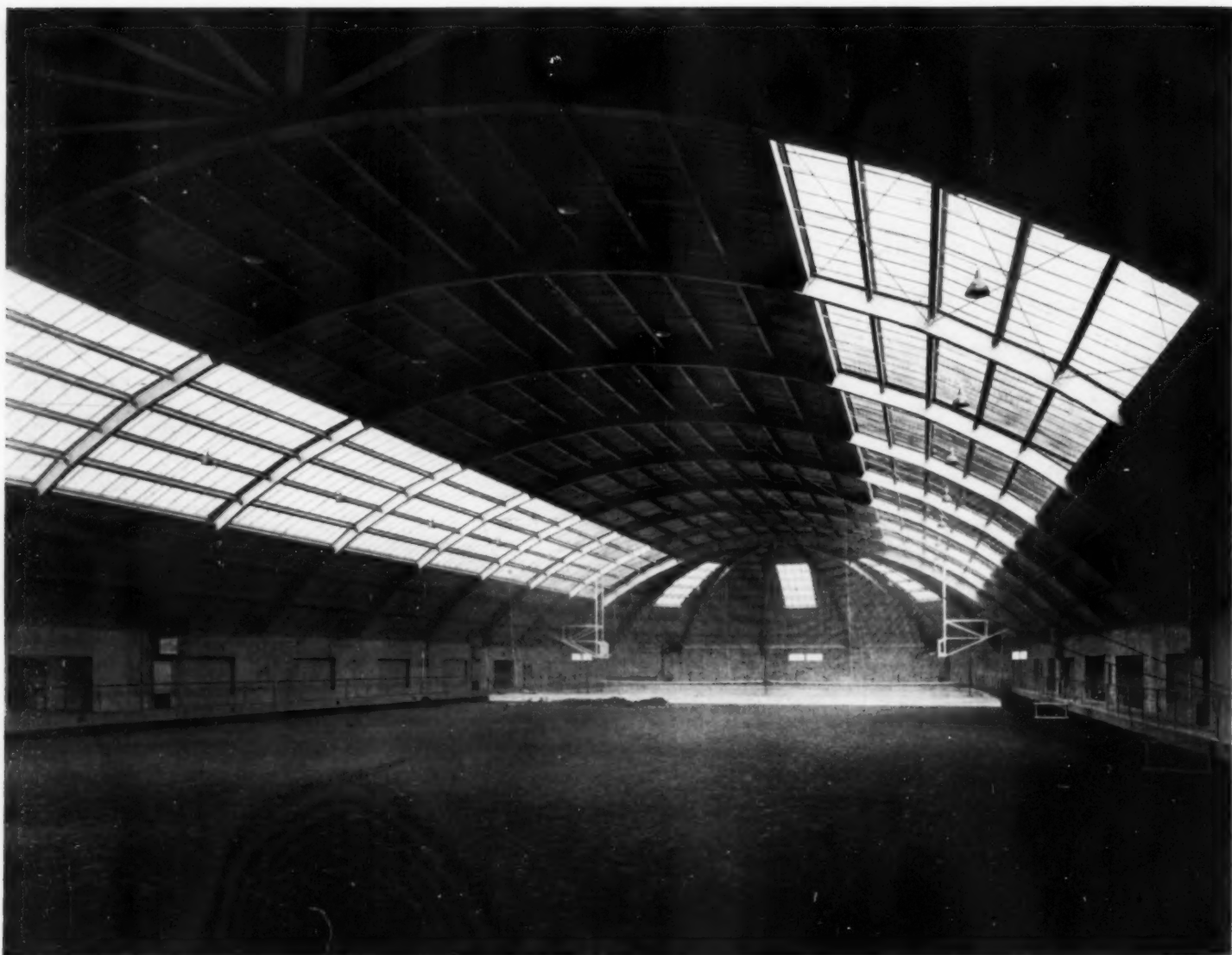
SWARTHMORE, PENNSYLVANIA

KARCHER AND SMITH, ARCHITECTS

**ROBERT E. LAMB
DESIGNER**



ELEVATION



Photographs by E. V. Wenzell

FIELD HOUSE

SWARTHMORE

KARCHER AND SMITH, ARCHITECTS

The Field House contains a running track; a wooden floor for tennis, basketball and other sports requiring a hard floor; and a dirt floor for baseball, lacrosse, soccer and football practice; a roof high enough (and unencumbered with trusses) for batted balls, together with all accessory rooms required for wrestling, boxing, fencing, and team dressing rooms. These requirements fixed the size and disposition of the plan.

The plan thus provides a clear playing space, one hundred and twenty-five feet wide and three hundred and twenty-five feet long. This gives a running track of one-seventh of a mile. If used as an assembly hall, this area will accom-

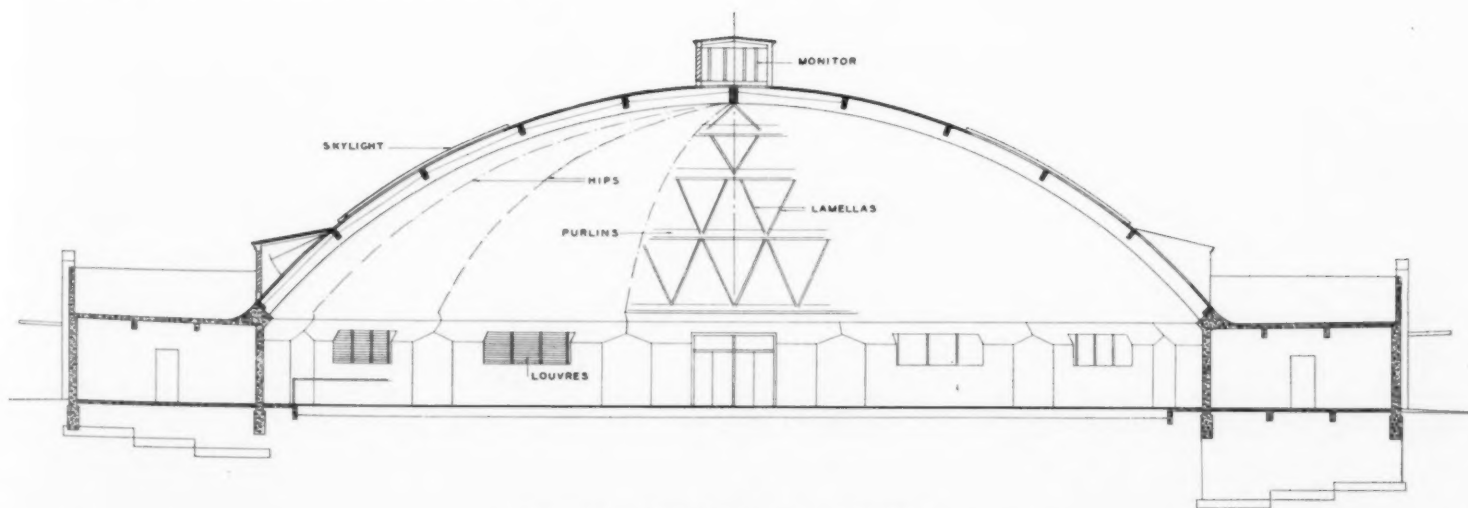
modate 6,000 persons. The height, clear of all obstruction, is forty-one feet. Ample daylight without sun glare is obtained through the use of amber corrugated glass covering an area equivalent to 25 per cent of the floor area. All walls are of reinforced concrete, the cross walls between the small side rooms being utilized to take the thrust of the roof arches. This roof construction is a modern development in the use of straight I-beams, riveted at slight angles to form the great arc of the roof. By this method trusswork is eliminated and greater height and grace achieved. The Arch Roof Construction Co., Inc., New York, is the sole U. S. Licensee of the patents covering this type of construction.



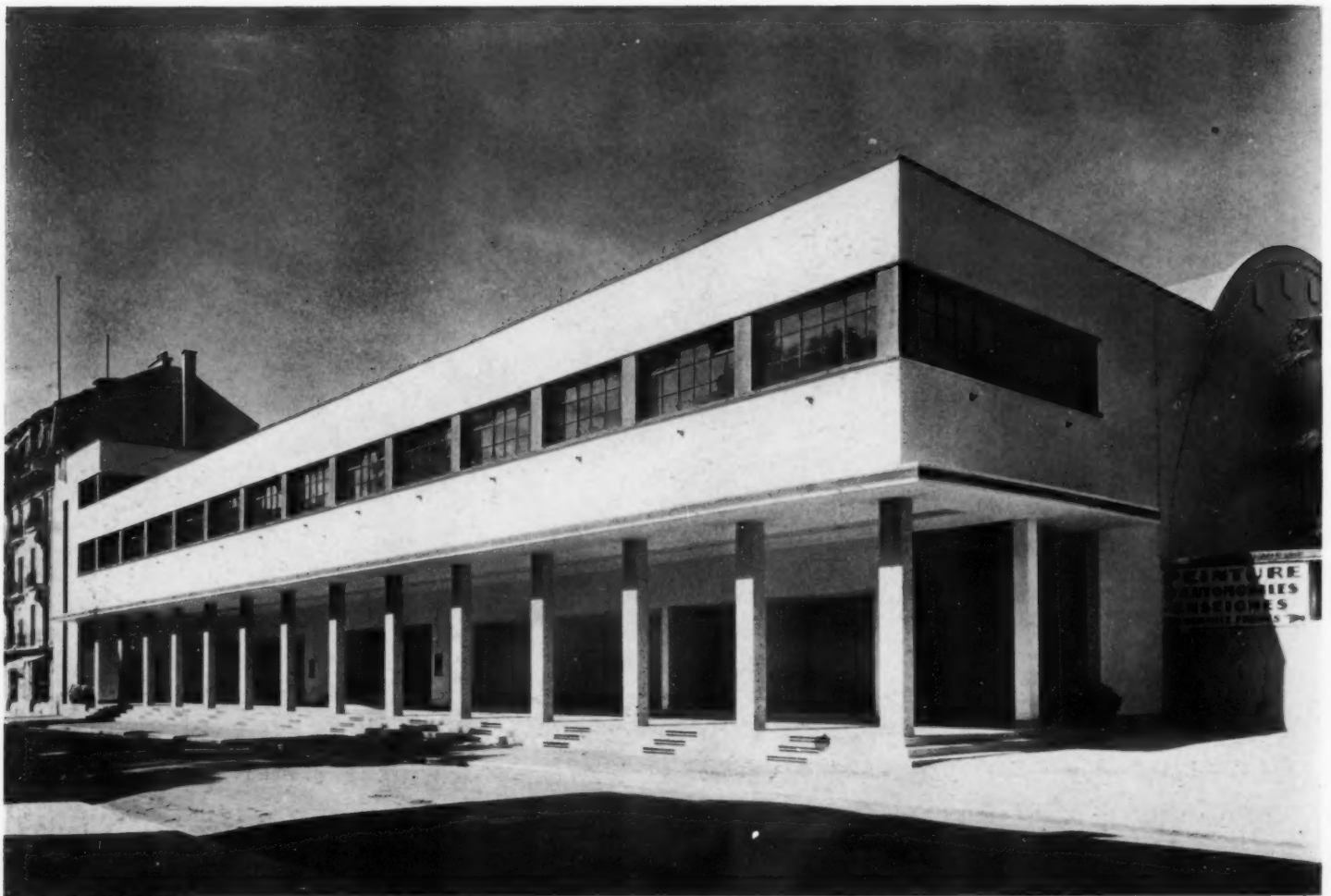
COLLEGE

SWARTHMORE, PENNSYLVANIA

ROBERT E. LAMB, DESIGNER



CROSS SECTION AT CENTER

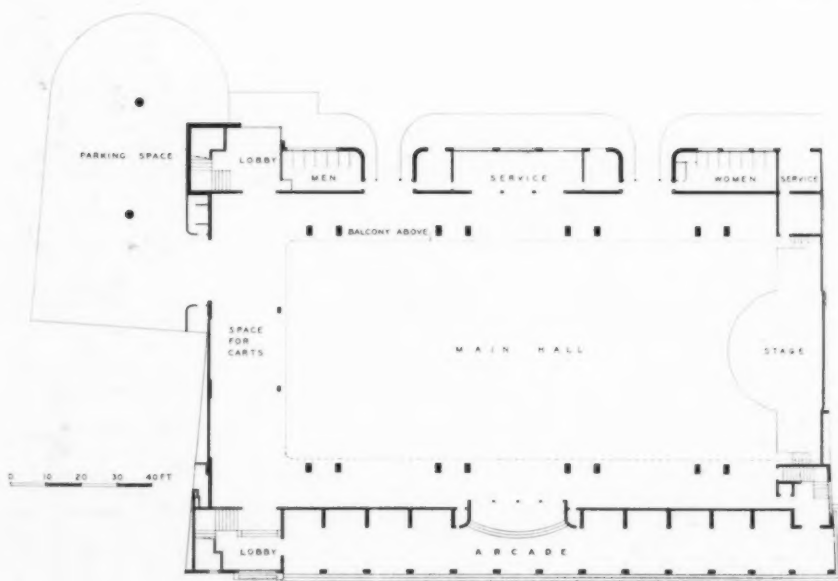


Photographs by de Jongh

COVERED MARKET

AT VEVEY, SWITZERLAND

TAVERNEY, SCHOBINGER & GETAG
ARCHITECTS



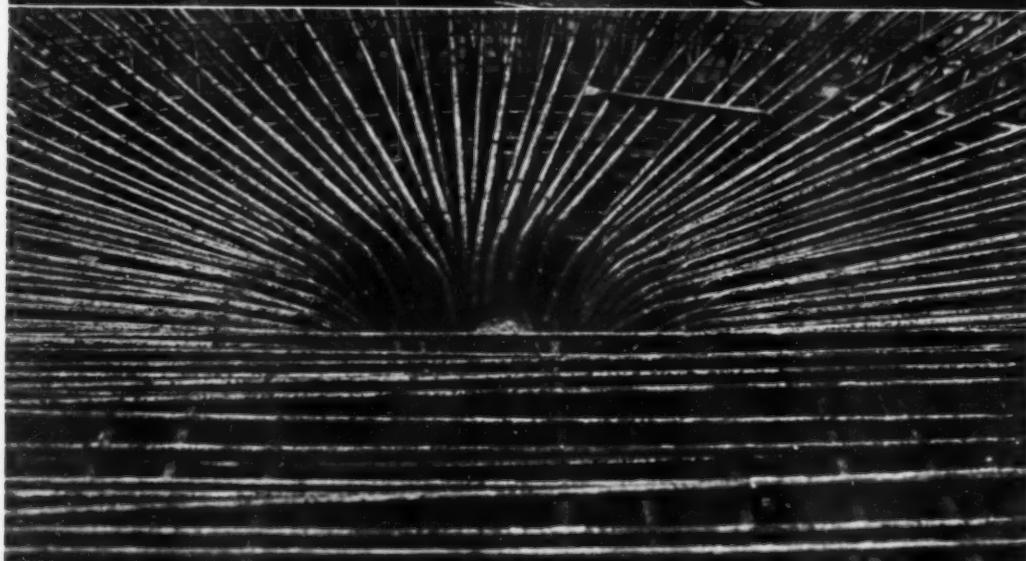
A modern ferroconcrete structure recently completed in the center of the old city of Vevey. Besides being completely equipped for a public market, provisions are made for its conversion to any public use, such as wine fairs, concerts, dances, sporting events. Opening off the balconies on the second floor are a series of exhibition rooms. Perhaps the most interesting feature of the building is the fact that it is so designed and constructed that at any later date up to fifty apartments may be built on top of it.



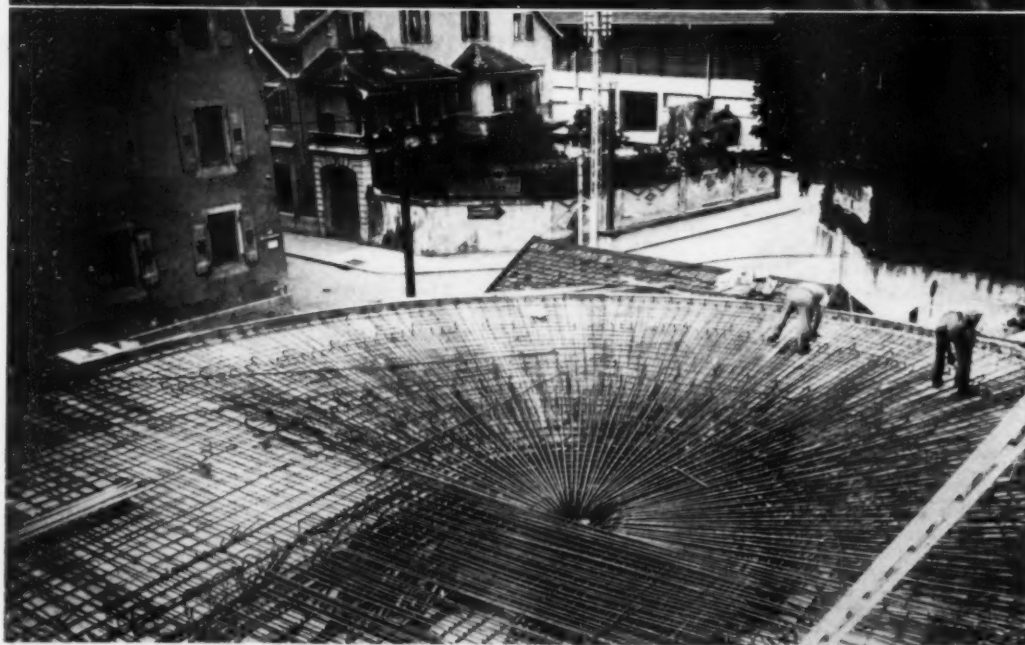
COVERED MARKET



1



2



3

1 M. Sarrazin, Brussels engineer, was consultant on all concrete work. The parabolic arches of the Great Hall were cast in three separate sections by the use of special movable scaffolding. 2 Detail of the cantilevered vehicle shelter, showing care with which reinforcing was designed and placed. 3 Vehicle shelter ready for pouring. The entire structure reveals the accuracy and brilliance with which the concrete was handled; important economies were achieved by close figuring of the smallest structural detail.

AT VEVEY, SWITZERLAND

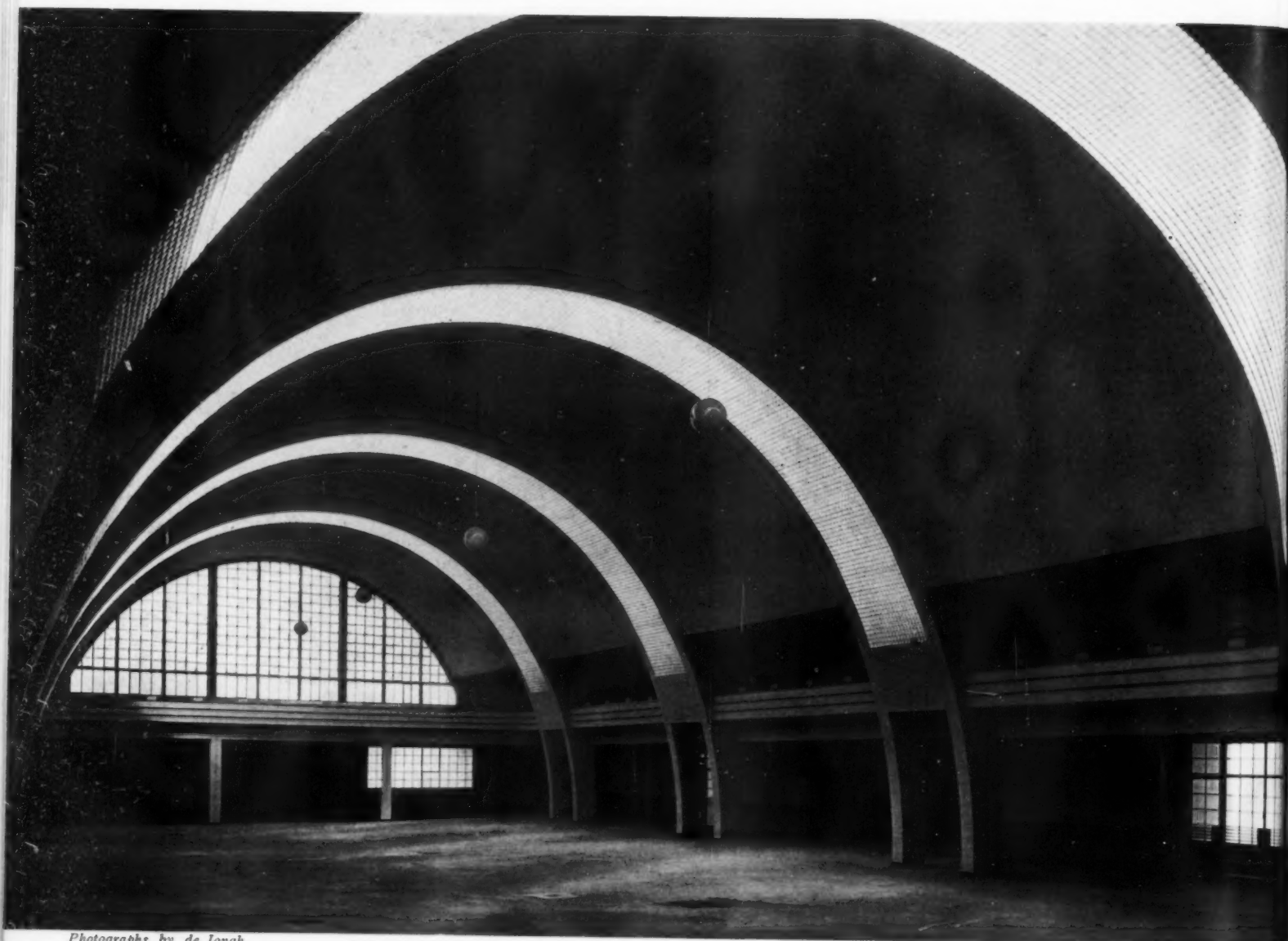
TAVERNEY, SCHOBINGER & GETAG
ARCHITECTS



The provisions for in and out traffic are exceptionally well handled, vehicular traffic using one side, pedestrian traffic the other. Market stalls are provided under the porch of the opposite side, while larger merchants, requiring trucking, use this entrance to the Great Hall.

Photographs by de Jongh



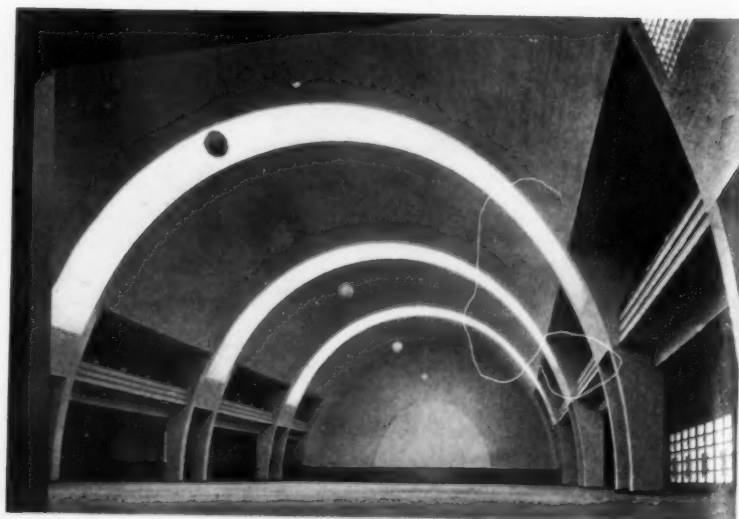
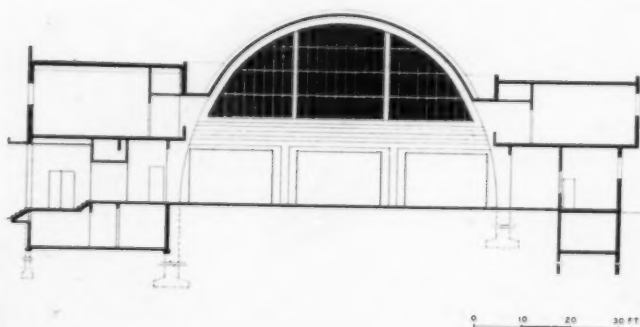


Photographs by de Jongh

COVERED MARKET

VEVEY, SWITZERLAND

SECTION AND VIEWS OF GREAT HALL



TAVERNEY, SCHOBINGER
& GETAG, ARCHITECTS

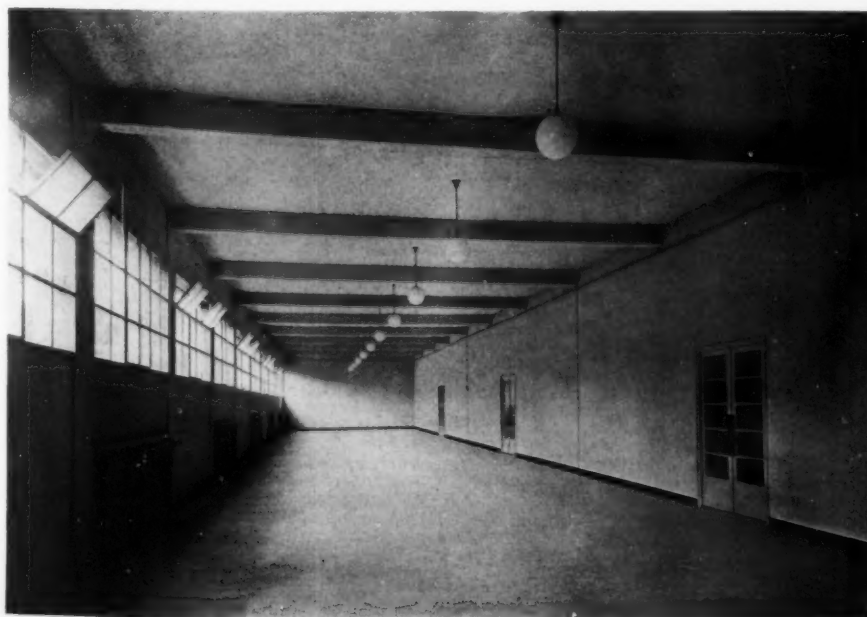


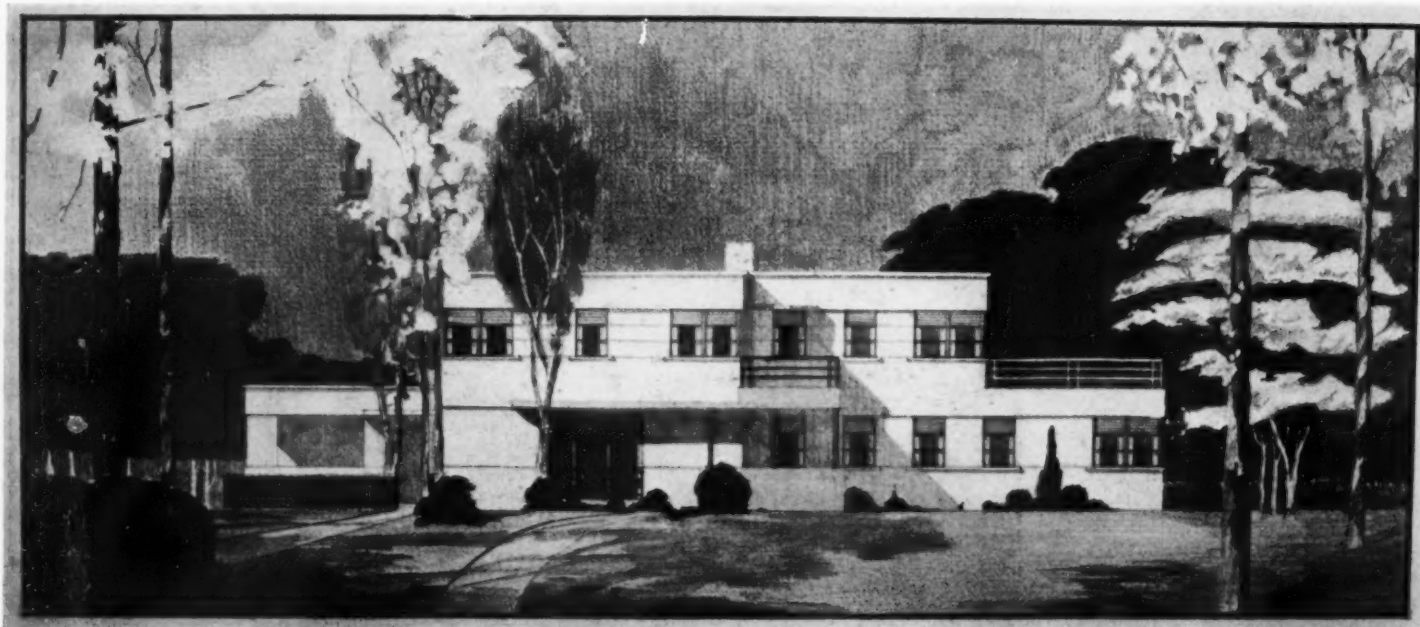
EXHIBITION ROOMS OPEN OFF THESE GALLERIES

The Great Hall is ingeniously lighted by means of translucent slabs placed inter-axially between the twin arches; this lighting is completed by the large window at the end of the hall. Off the galleries on both sides of the hall open exhibition spaces which can be converted into a wide variety of shapes.

EXHIBITION ROOMS ARE WELL LIGHTED . . .

AND READILY CONVERTIBLE





HOSPITAL FOR DR. W. A. BOYSON MECHANICSBURG, PA.

EDMUND G. GOOD, JR., ARCHITECT



• SECOND FLOOR PLAN •



• FIRST FLOOR PLAN •



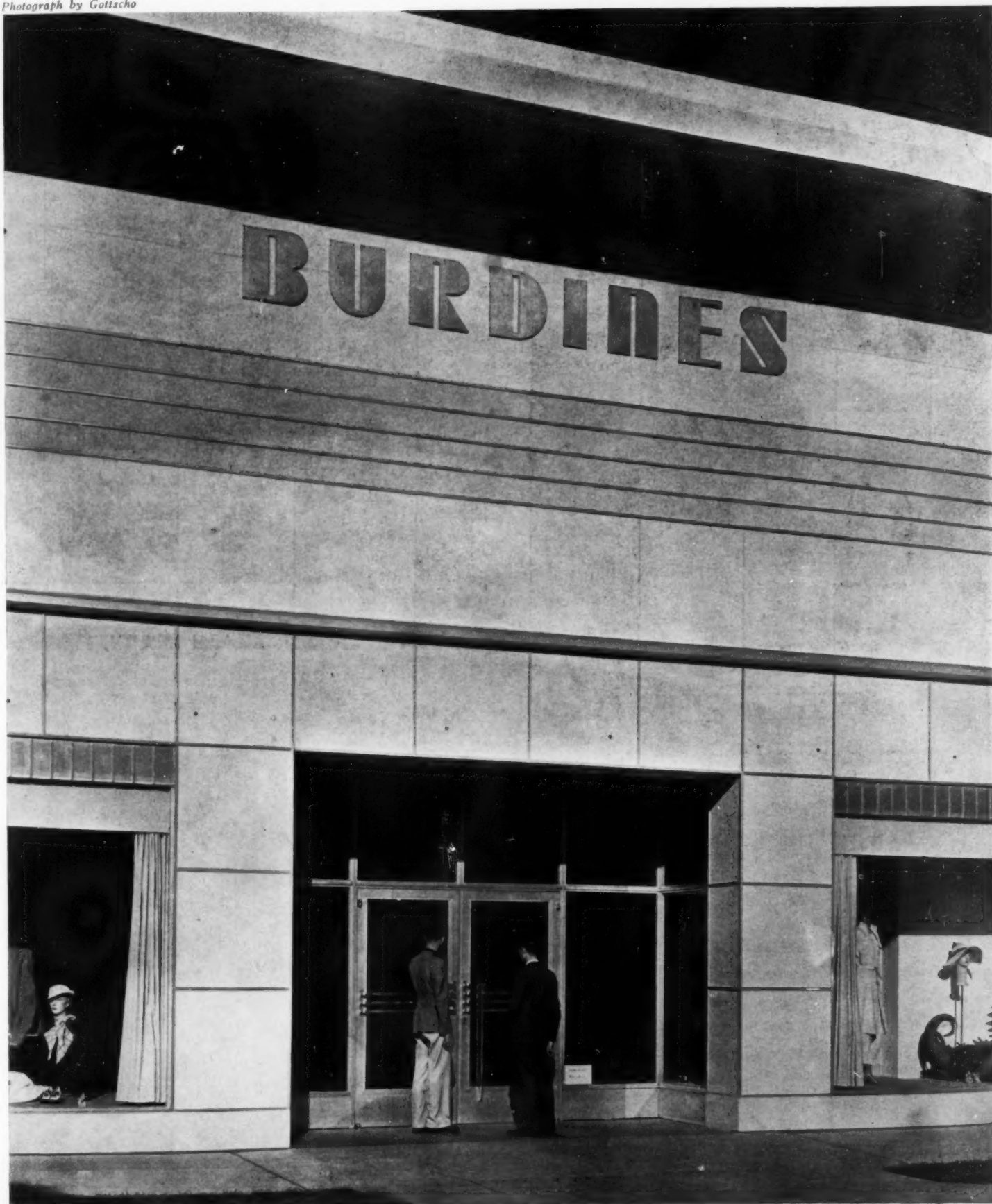
• BASEMENT PLAN •

A small private hospital designed for Dr. William A. Boyson of Mechanicsburg, Pa., to meet the varied demands made upon a physician in a small town, the center of an agricultural region which is ten miles from the nearest general hospital. It was required that the plant be operated with a minimum of help. Parking was no problem, as an entire half block, with streets on two sides and an alley on the third, was available for the building. To eliminate an office girl, patients are directed to the waiting room from the porch and find chairs placed so that the door to the Doctor's office is in view. They enter the office in turn at the ring of a buzzer, and depart through the side door. The admission room for the hospital, almost directly off the garage drive, is readily accessible for emergency cases. Fourteen beds are available in private rooms and wards. Living quarters for Dr. Boyson and his family are on the second floor, entirely separated from the medical and hospital division of the building. Ample decks compensate for any lack of ground level outlets.

BURDINE'S
ROBERT LAW WEED

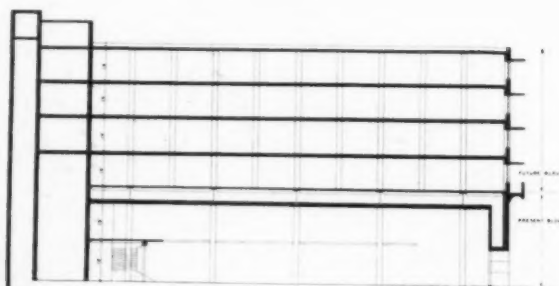
Photograph by Gottscho

MIAMI BEACH, FLORIDA
ARCHITECT





Photographs by Gottscho



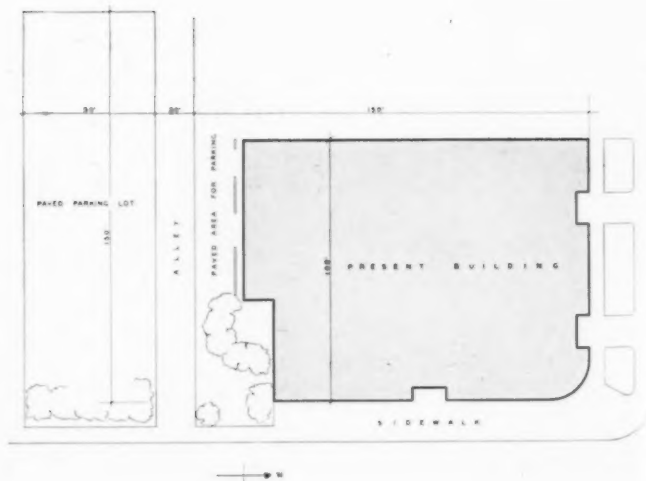
SECTION SHOWING PRESENT STRUCTURE WITH PROPOSED ADDITIONS

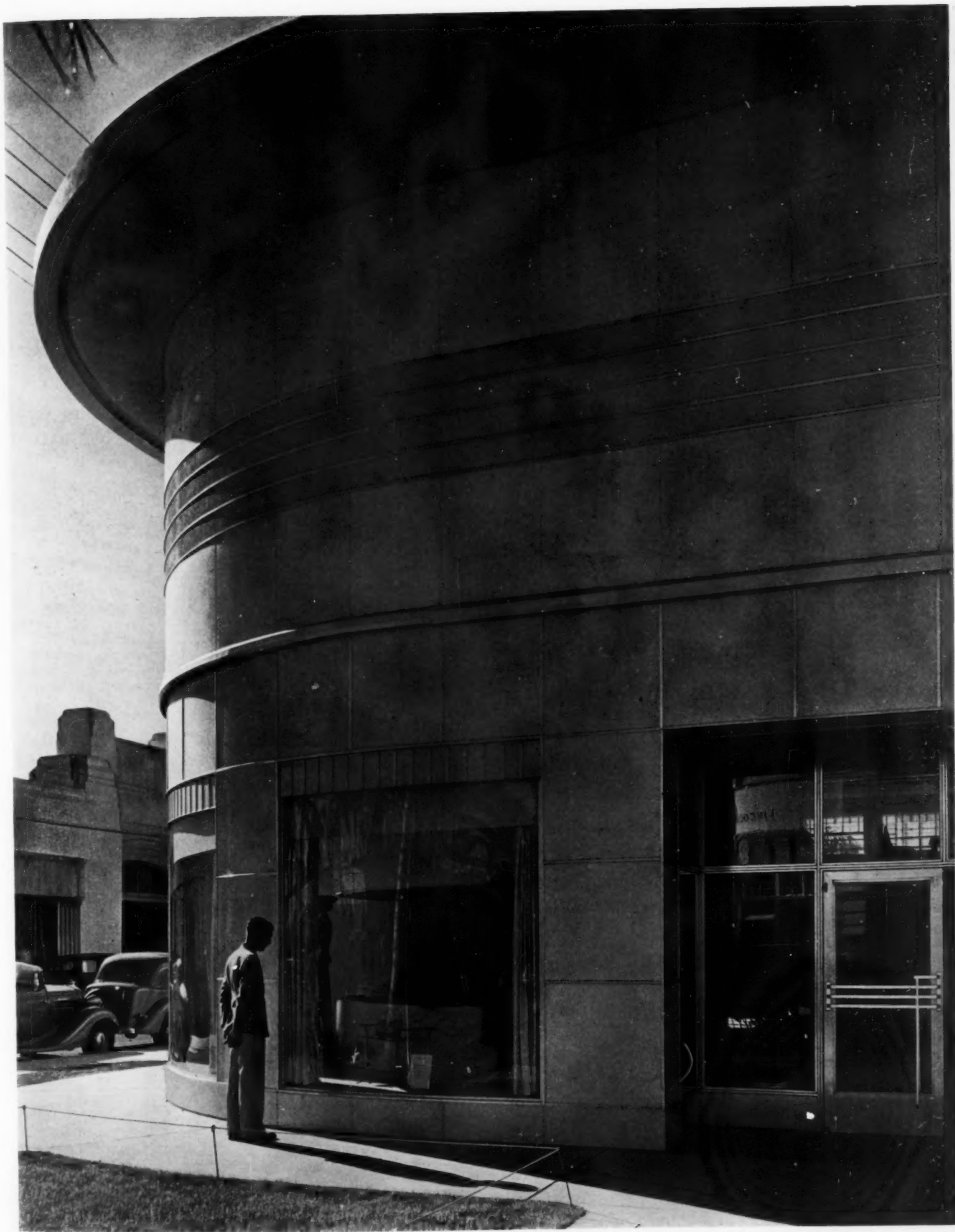
The owner desires the building to accommodate the tenant's present business as fully and completely as possible but, at the same time, increased land value or a necessity for expansion on the part of the tenant may require additional floor area; or, at the termination of the lease, a different division of the ground floor area may be desirable. Air conditioning may be required for additional floors, also elevators. Additional floors may be used for offices, or for store space, or even for living quarters.

BURDINE'S

MIAMI BEACH, FLORIDA

**ROBERT LAW WEED
ARCHITECT**





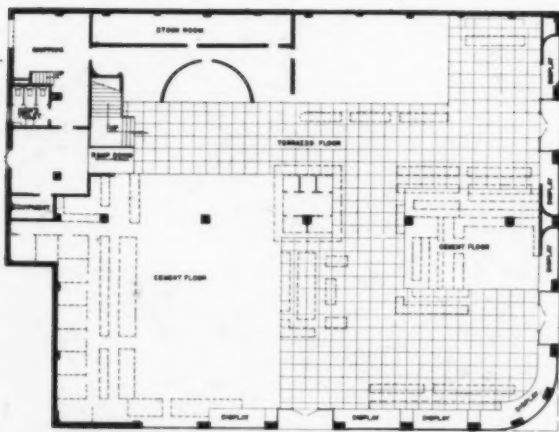


Photographs by Gottscho

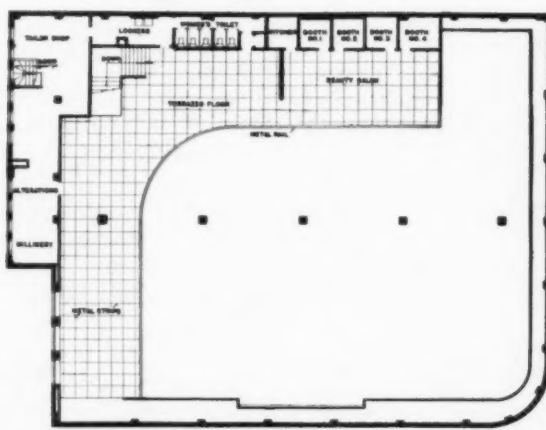
BURDINE'S

MIAMI BEACH, FLORIDA

ROBERT LAW WEED
ARCHITECT

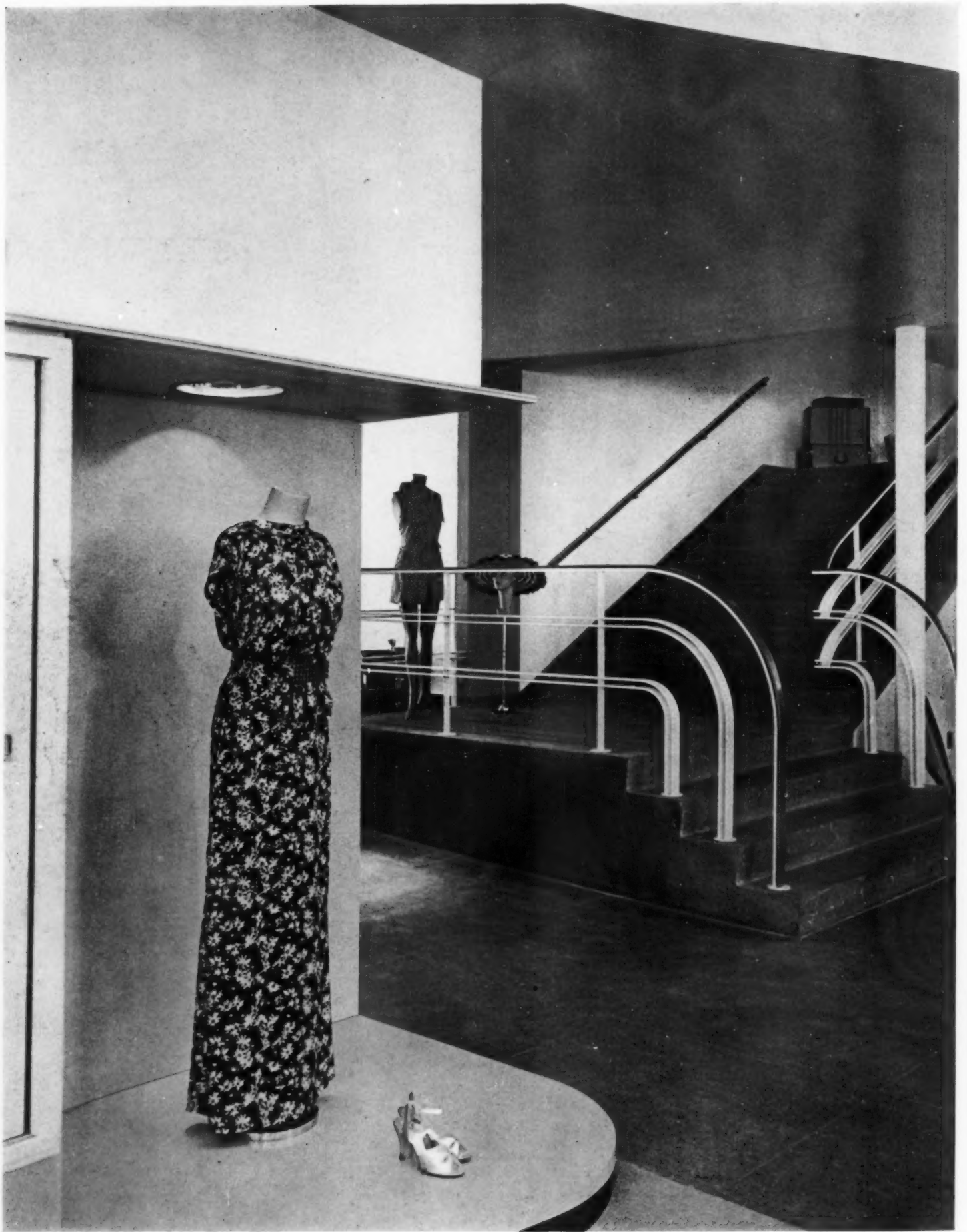


FIRST FLOOR PLAN



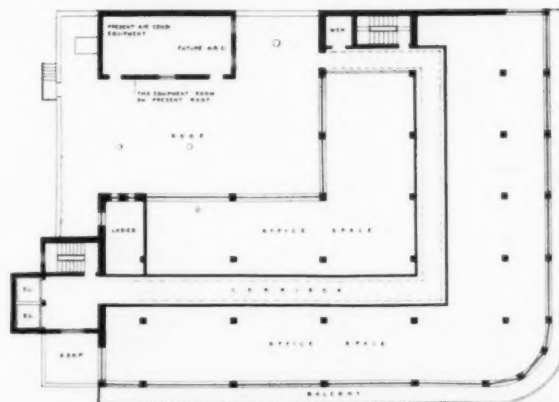
SECOND FLOOR PLAN





ROBERT LAW WEED
ARCHITECT

The tenants desired a store with a tropical feeling—light, open, cheerful. To achieve this the architect designed the floor plan very carefully. The least desirable floor area for sales purposes, under the mezzanine, is used for fitting rooms, toilets, locker rooms, shipping rooms, and so on. These parts are all fully air conditioned. All partitions, except permanent ones inclosing toilets, equipment room, and second floor workroom, are a part of the store fixtures and are easily removable. No store fixture or case or partition is over 7'0" high, making the whole effect very open.



PLAN OF FUTURE VERTICAL EXTENSION

Photographs by Gottscho





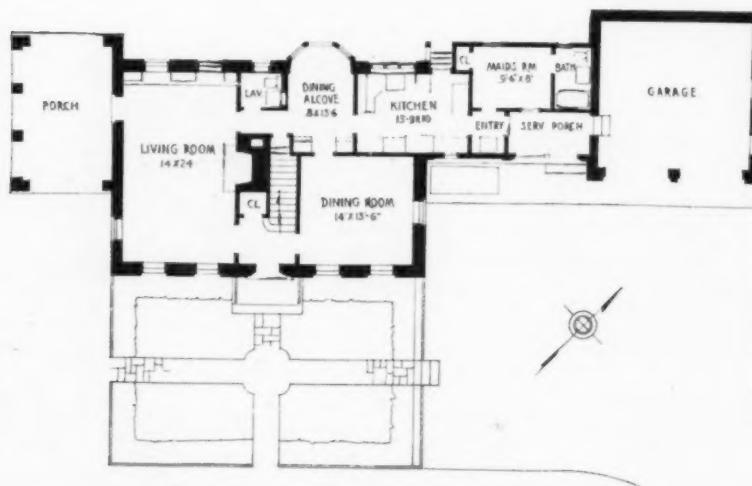
Photographs by Gottscho

RESIDENCE OF STEPHENSON M. BOBIS

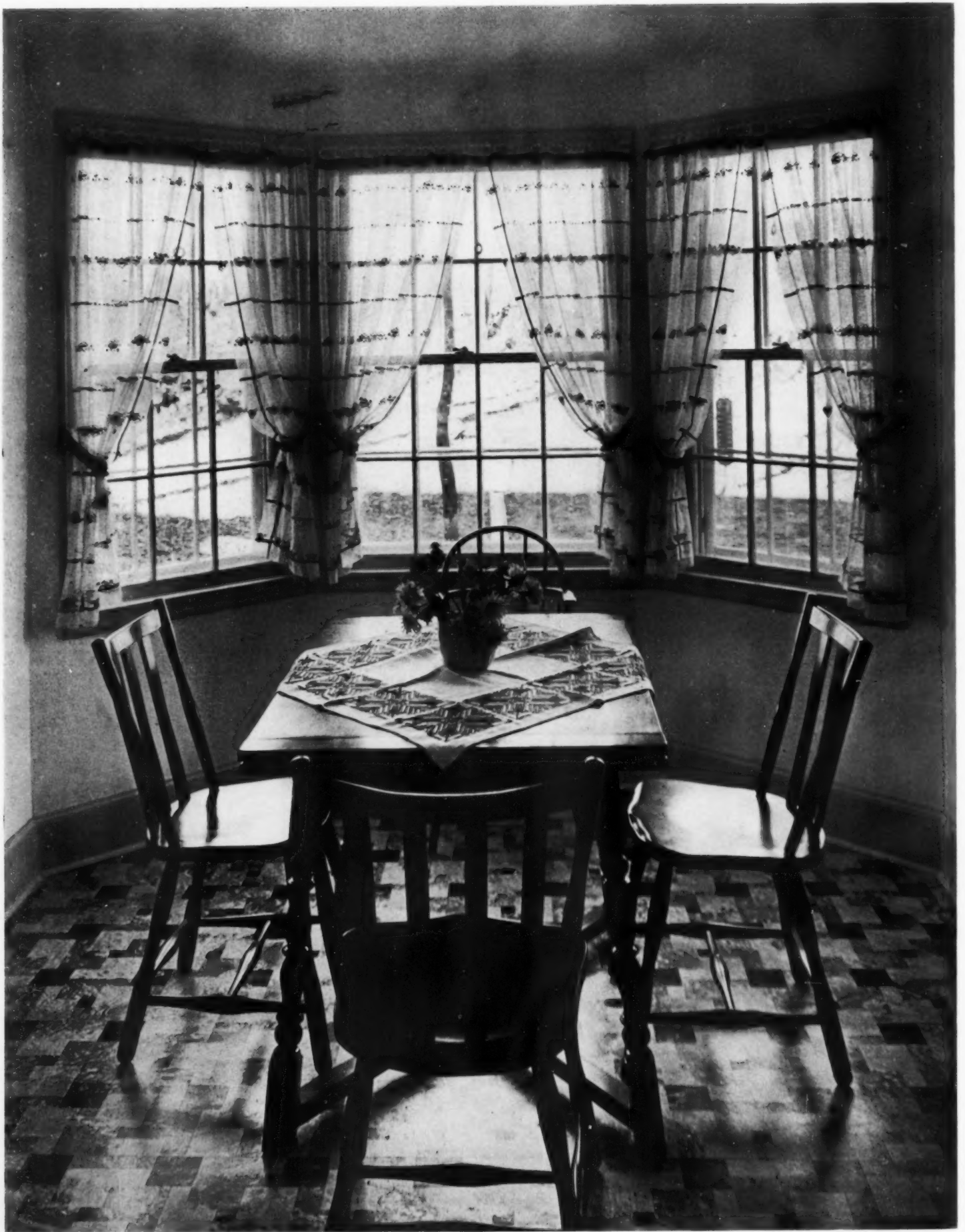
DARIEN, CONNECTICUT



**WALTER B. KIRBY
ARCHITECT**









Photographs by Gottsche

RESIDENCE OF STEPHENSON M. BOBIS

DARIEN, CONNECTICUT

**WALTER B. KIRBY
ARCHITECT**

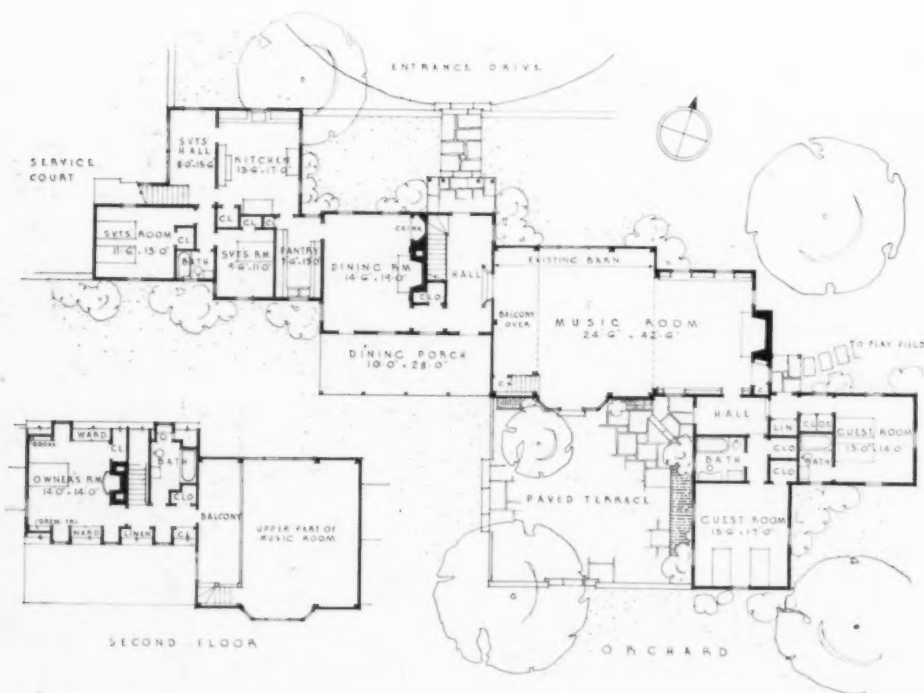
Built of native field stone, the entire first floor of this house is of concrete—Floroform precast beams and slabs, and poured footings. All first floor finishes (oak, rubber and asphalt tile) are laid in mastic. The heating is hot air, circulated and humidified. Rockwool insulation is provided in upper story. Double-hung wood sash are used throughout except in basement, where steel sash are employed.



Photographs by Van Anda

COUNTRY HOUSE OF MRS. J. B. CASSERLY

WILTON, CONNECTICUT



**BURTON A. BUGBEE
ARCHITECT**







Photographs by Van Anda

HOUSE OF MRS. J. B. CASSERLY

WILTON, CONNECTICUT

BURTON A. BUGBEE, ARCHITECT

This is a country house on a 32-acre Connecticut hilltop, designed for use in the warmer months and for winter weekends. Effort was made to secure maximum sunshine and air—all major rooms have three exposures, the music room four. Prevailing summer breezes are from the southwest; views are to the southwest over the Norwalk River valley, and north to the Redding Hills. Immediately south of the house is an ancient apple orchard. The entrance drive is on the north side. The northeast doorway permits guest luggage to be brought in directly from the drive and also gives access to a play field east of the house.

The house was built about an existing barn whose fine oak and pine interior had valuable acoustic properties. This barn, provided with metal casement windows and a balcony, with an extension to the east, became the music room. The extension contains bookshelves, a fireplace and, south of the fireplace, a built-in wood storage cupboard filled from the outside. The exterior of the barn was sheathed with insulating board, cross-furred, and covered with heavy hand-rived shingles.

The rest of the house is conventional frame construction with quilt insulation, plastered interiors, and shingle or siding exteriors. The roof is of wood shingles. Flooring is oak throughout with oak plank, screwed and plugged, in the music room, carpeting in the dining room, and linoleum in kitchen, pantry, servants' hall, and all bathrooms. Kitchen and pantry cupboards are steel, with monel metal sinks and counter tops. In the owner's bedroom, the only room on the second floor, the space under the eaves between dormers is utilized by built-in wardrobes, sliding trays, dressing table, and shoe cupboards.

The basement, fully excavated only under the western half of the house, contains a one-car garage, laundry, wine cellar, storage, and boiler room. Heating system is by two-pipe steam, oil burner, with concealed radiation in all principal rooms. All piping is brass and copper. On another portion of the property are a chauffeur's cottage, and a four-car garage.

The house was built in 1934 at a cost of approximately 30¢ a cubic foot.



Photographs by Van Anda

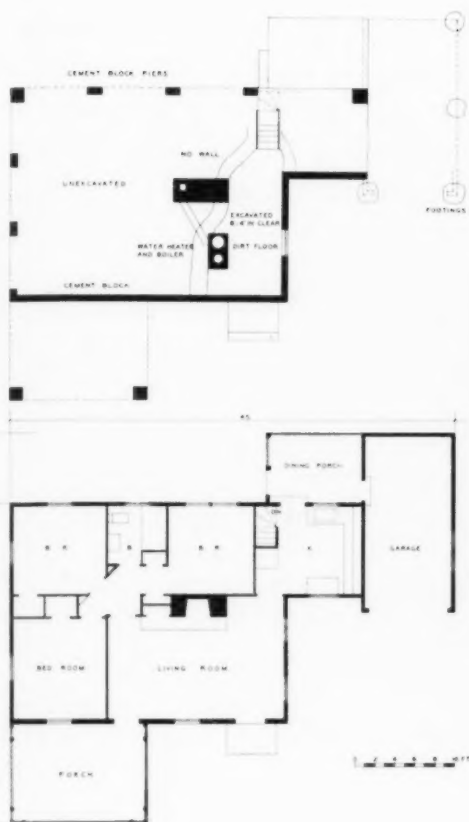
Above: FIREPLACE END OF MUSIC ROOM

**HOUSE OF MRS. J. B. CASSERLY
WILTON, CONNECTICUT**

BURTON A. BUGBEE
ARCHITECT



Right: ENTRANCE HALL WITH
MUSIC ROOM STEPS AT RIGHT



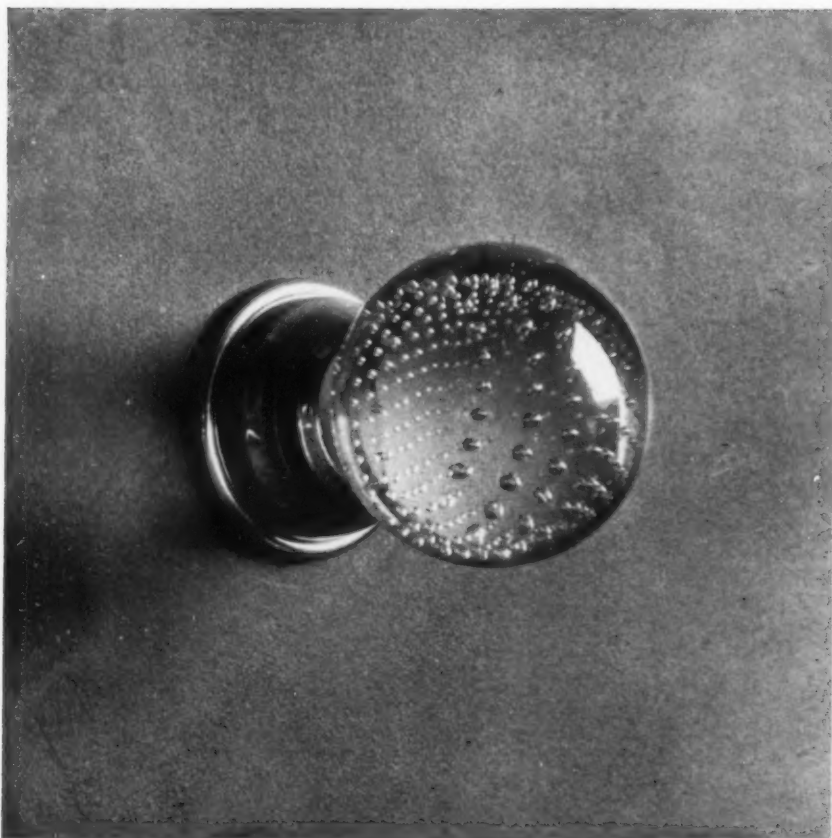
COTTAGE OF R. M. HAUCK

TWO COTTAGES AT LAKE MOHAWK SPARTA, NEW JERSEY

EDWIN R. CLOSS
ARCHITECT

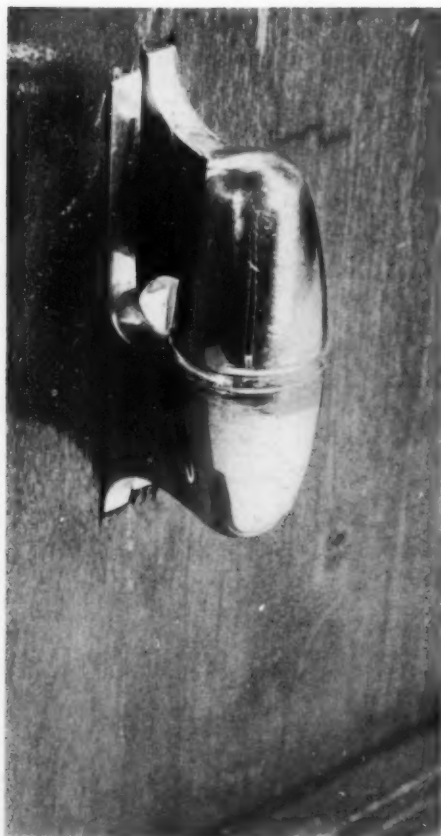
COTTAGE OF J. H. GLOVER





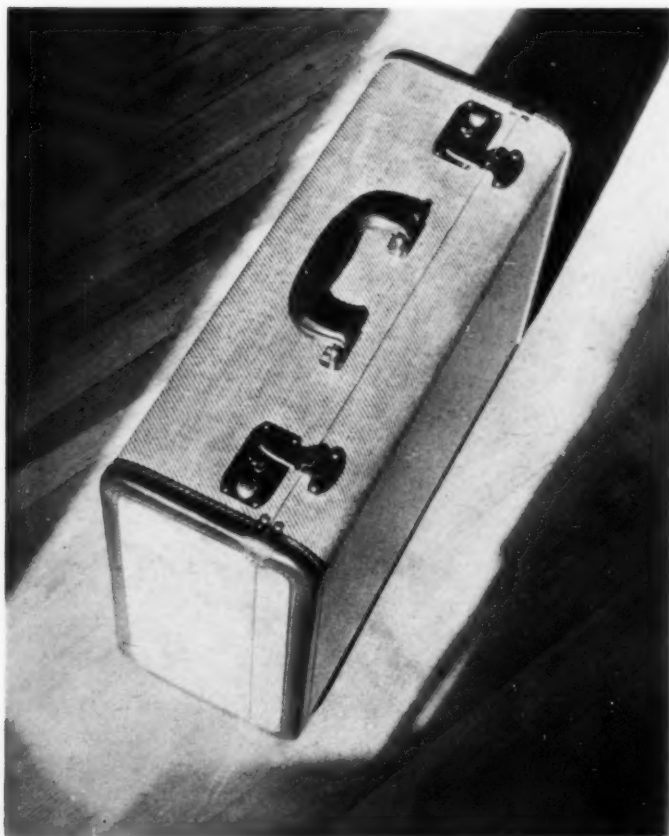
Glass door knob of special design.

Olive hinge.



Contemporary hardware design combines influences of tradition and industrial production methods. The influence of use is evident in examples where shape is suited to convenience and dependable operation.

Luggage hardware has been influenced by travel requirements: light weight, minimum projection

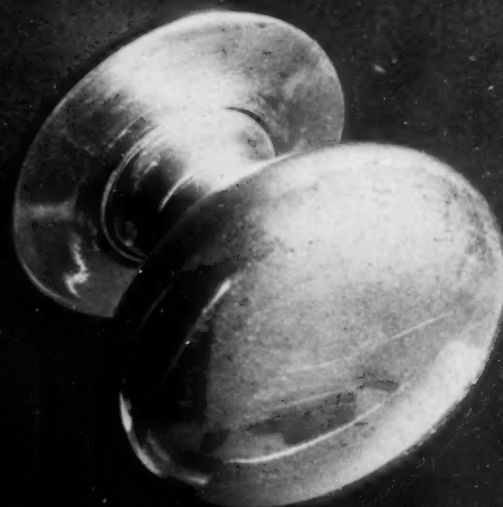




Door handles made in exact replica of sixteenth century hardware.

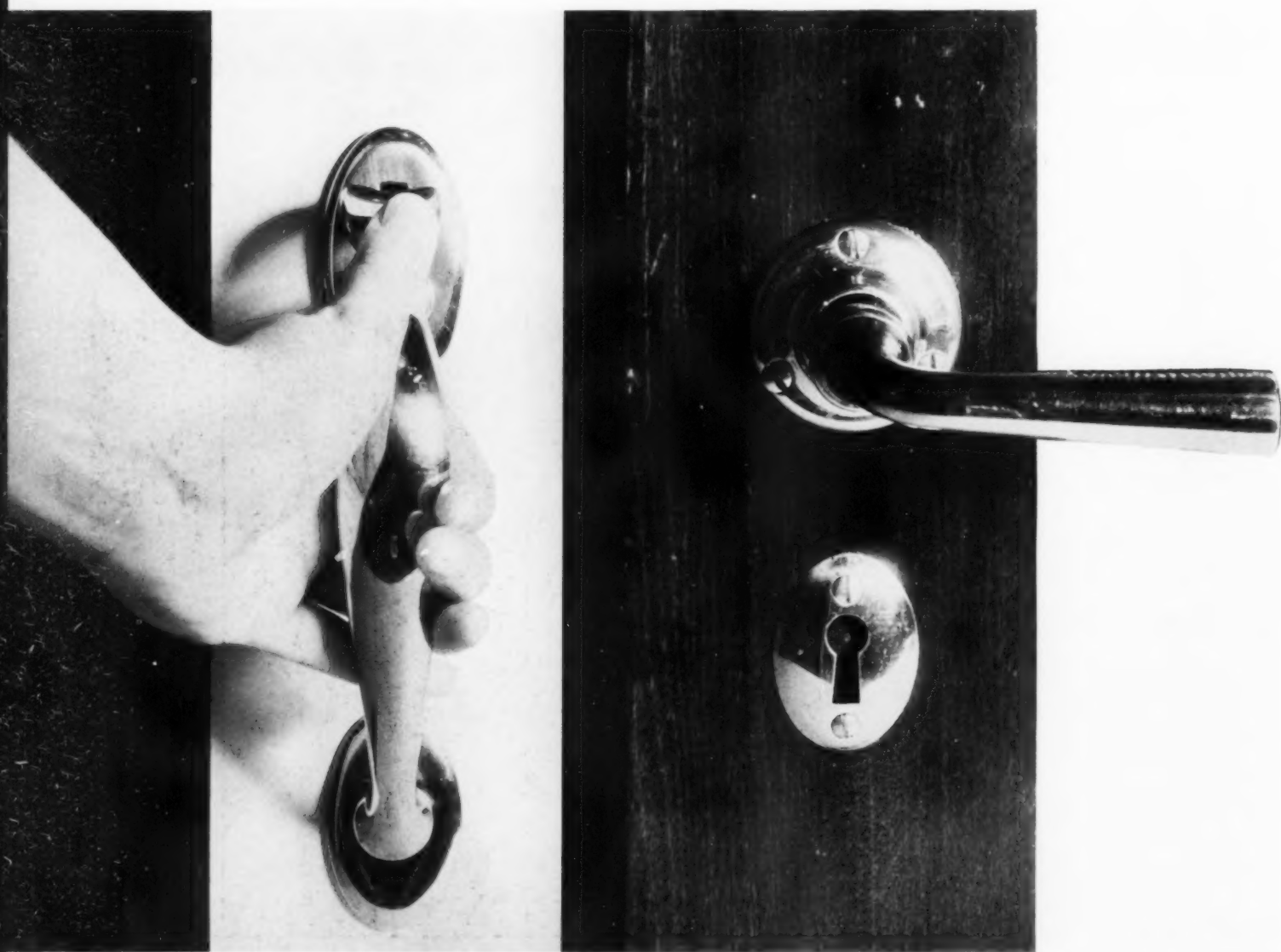
APPLIED DESIGN: HARDWARE

Door knobs: (left) a design by Gustav Jensen; (right) a standard shape.



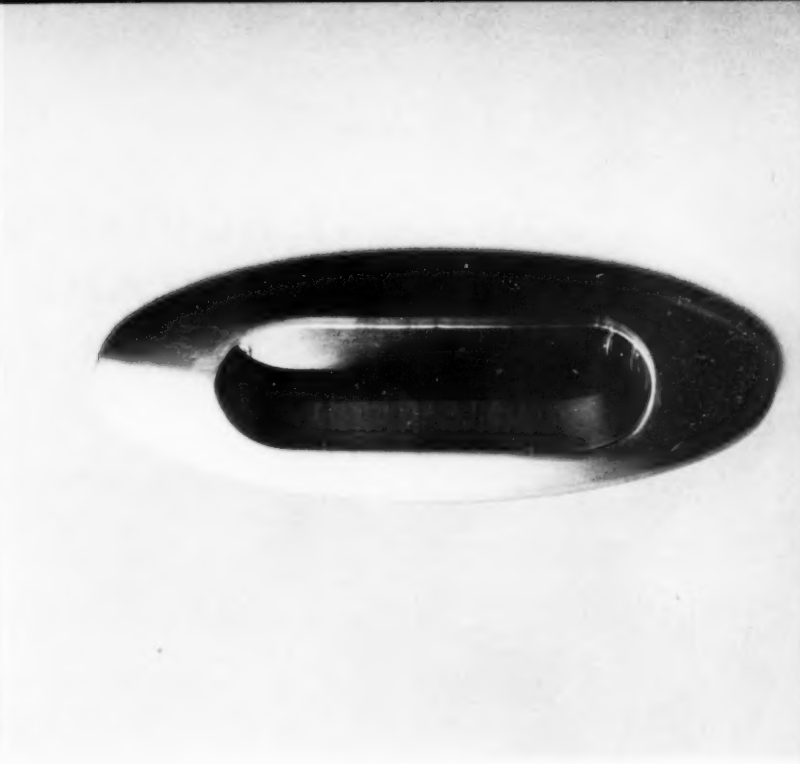
Photographs by Max Zimmerman

Standard moderate - cost door latches designed for machine production.





Drawer pull correctly shaped for its purpose and suited to casting or stamping in metal.



A conventional window lift.



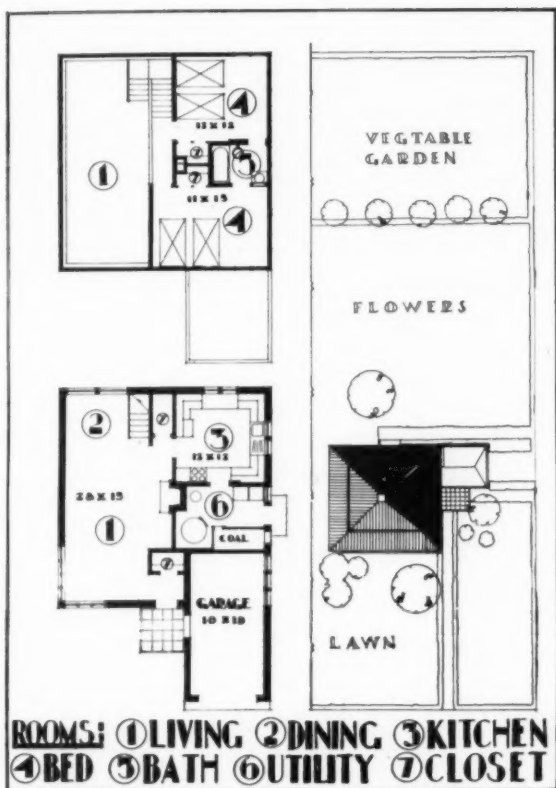
The design of automobile hardware has responded to convenience requirements. Bumper shows influence of safety engineering.

**LOW-COST HOUSES UNDER CONSTRUCTION
AT HIGHLAND PARK, ILLINOIS
FOR THE FREDERICK H. BARTLETT REALTY COMPANY**

SKIDMORE AND OWINGS, ARCHITECTS

• COMPARATIVE BREAKDOWN OF QUANTITIES AND COSTS •

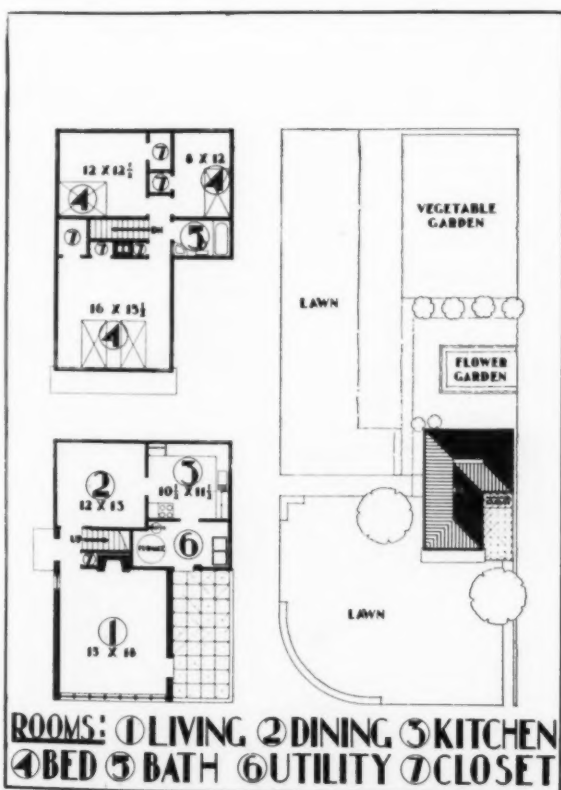
HOUSE	NUMBER OF ROOMS	CUBAGE	SQ. FT. OF FLOOR	SQ. FT. OF GLASS	PERCENT. OF WOOD	PERCENT. OF BRICK	ESTIMATED COST
1	5 with BATH and GARAGE	15,040	1,265	247	40	60 FIREPLACE and CHIMNEY	\$3,500
2	7 with BATH	13,775	1,275	237	75	25 FIREPLACE and CHIMNEY	\$3,750
3	7 with BATH	14,840	1,400	165	30	70 FIREPLACE and CHIMNEY	\$3,750
4	5 with BATH	11,100 670 cu. ft. more because of 9'-0" ceiling	930	150	100	FIREPLACE and CHIMNEY	\$3,068



HOUSE NO. 1

5 rooms with Garage
15,040 ft. cubage

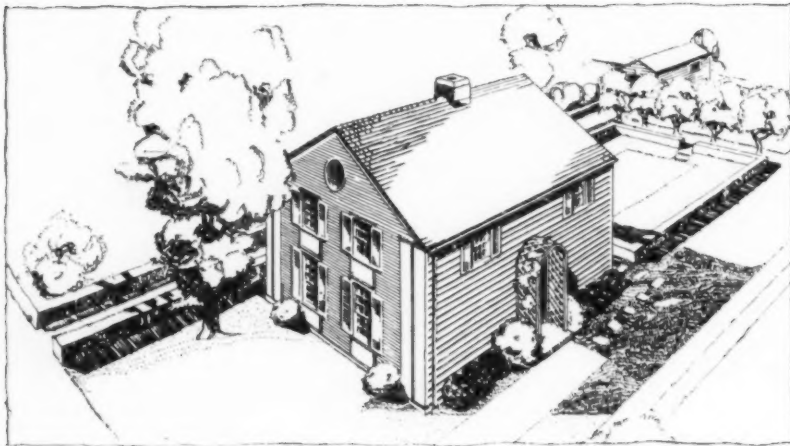
COST **\$3,500**



HOUSE NO. 2

7 rooms
13,775 ft. cubage

COST **\$3,750**

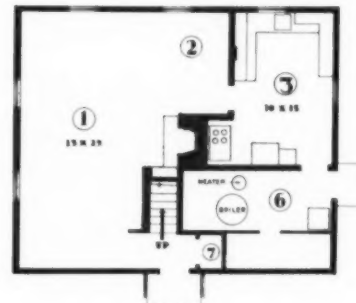
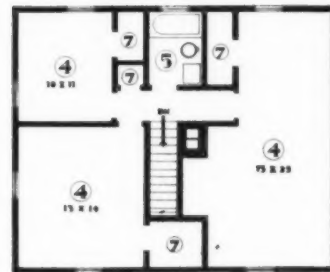


HOUSE NO. 3

7 rooms

14,840 ft. cubage

COST \$3,750



ROOMS: ① LIVING ② DINING ③ KITCHEN
④ BED ⑤ BATH ⑥ UTILITY ⑦ CLOSET



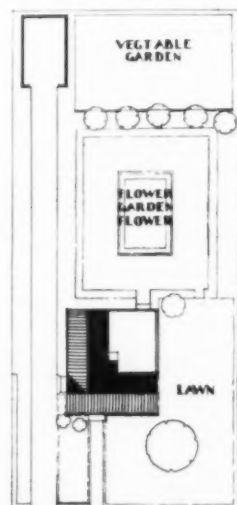
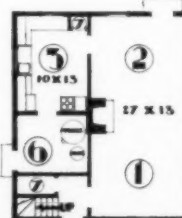
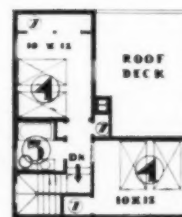
HOUSE NO. 4

COST \$3,068

5 rooms

11,100 ft. cubage

670 cu. ft. more because of 9'-0" ceiling



ROOMS: ① LIVING ② DINING ③ KITCHEN
④ BED ⑤ BATH ⑥ UTILITY ⑦ CLOSET

Perspectives and plans photographed by Chicago Architectural Photographic Co.

TECHNICAL NEWS AND RESEARCH

new designs made possible by die casting

An exhibit of die-cast products has been installed under the sponsorship of the American Die Casting Institute at the Metal Products Exhibits (a permanent exhibition of metals, alloys, plastics, and finishes), located in the International Building, Rockefeller Center, New York.

Die casting—the fabrication of accurately dimensioned products by means of machines which force molten metals under pressure into steel molds or dies—has had a rapid growth in American industry within recent years. The astonishing productivity of this process and its versatility of performance permit quantity production at low unit cost. An immense number of castings can be made before the die wears out. Close dimensions are held. The fabrication of complicated shapes is simplified. Machining operations are eliminated. The work of many machines which otherwise would be required for the forging, tooling and assembling of separate parts is done by a single die caster turning out the same object as an integral casting. . . . Die casting is a comparatively young art. Hardware, plumbing fixtures, electrical equipment, furniture and other household items are typical applications in the building field. To the architectural designer, as well as to the product engineer, the process gives increasing freedom from the old restrictions of fabrication and opens the way to the development of new structural forms and designs.

Present limitations: Almost any form, no matter how complicated, can be produced, provided proper equipment and dies are obtainable. The smallest die casting now being made is the element of the familiar "zipper" type of slide fastener; this is cast directly onto the fastener tape at a speed of about 160 tiny castings a minute. The "streamlined" radiator grilles seen on new automobiles this year are zinc alloy die castings which weigh from 15 to 24 pounds. Windshield frames measuring 50 by 22 inches and weighing 33 pounds have been die-cast. Theoretically, size is no barrier, since the die casting machines can be made as large as necessary if the economic demand so warrants.

Materials: The development of die casting has been made possible by the development of special alloys which in turn have been made possible by advances in the science of metallography. Temperatures are kept under accurate control at all stages of the die casting process. The alloy must melt quickly at a low temperature; after it is forced under pressure into the die, it must solidify almost instantly. Zinc, aluminum, magnesium, copper, tin and lead are base metals commonly used in the alloys.

Finishes: The castings require little work in preparation for finishing. Sprues are usually broken off by hand and a punch press removes fins and flashing which are then smoothed off with a minimum of filing or grinding. Buffing will give a smooth natural finish. If desired, the castings can be electroplated with chromium, nickel, copper, brass, bronze, gold or silver, or they may be coated with paints, varnishes, lacquers and enamels. They can also be used in combination with molded plastics.



automobile window regulating mechanism



Y-branch pipe fitting of die cast zinc



faucet handle type

Photograph courtesy New Jersey Zinc Co.

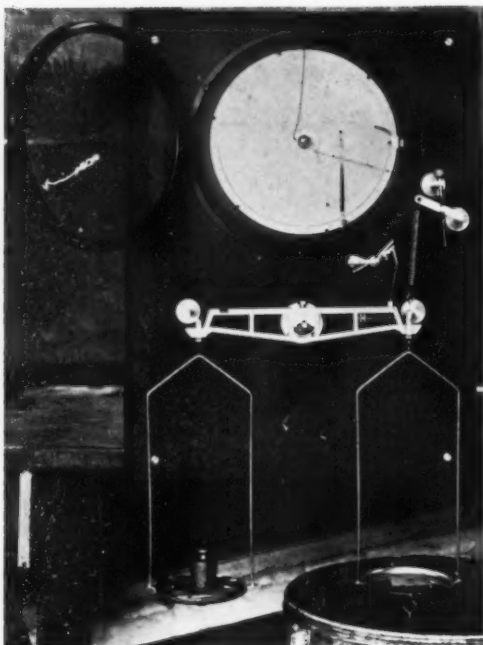


figure 1 —
absorptometer

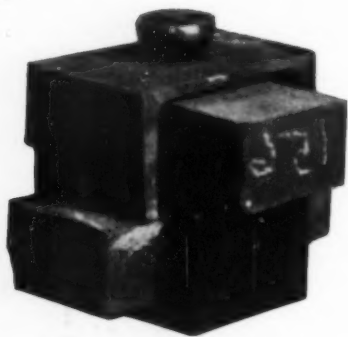


figure 2 —
tensile bond clip

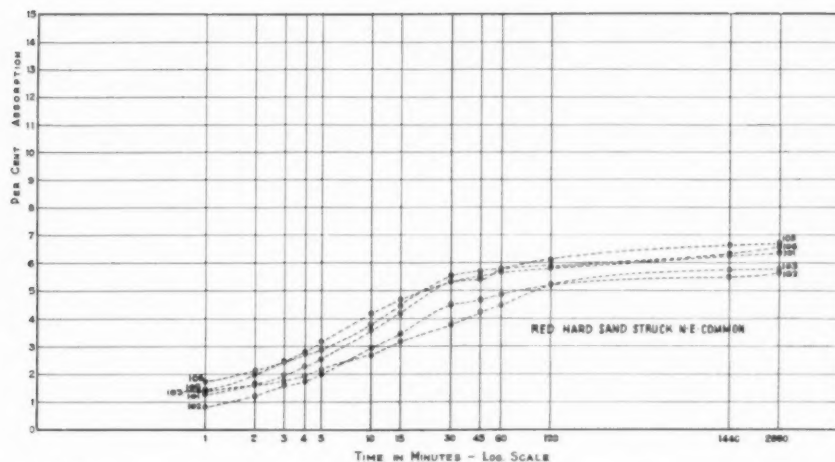


chart 1

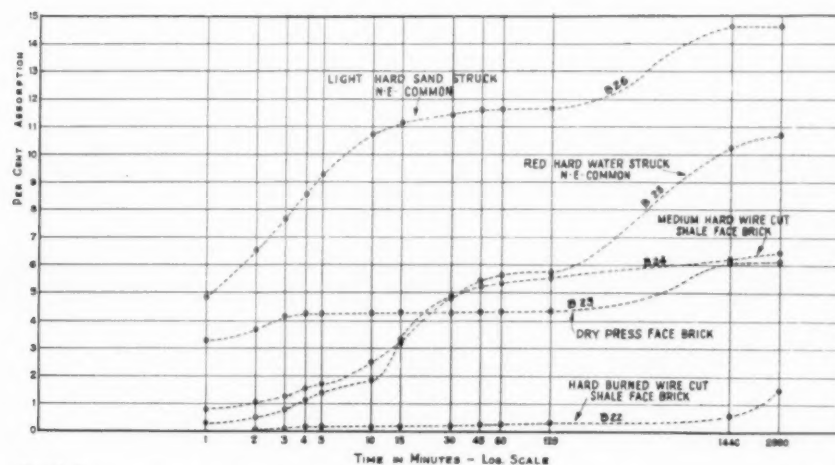


chart 2

Brick Type	Per Cent Absorp.	Spec. Mass Density Gms./c.c.	Porosity	Coef. of Saturation	Coef. of Density	Mod. of Rupture [Lb./sq. in.	Compressive Strength Lb./sq. in.
101	6.30	2.04	.23	.56	.77	1185	8050
102	5.58	2.06	.22	.51	.78	1285	9640
103	5.75	2.07	.23	.52	.78	1365	11680
105	6.64	2.00	.25	.53	.80	1150	8780
106	6.42	2.03	.24	.55	.77	1320	7380
22	1.45	2.43	.07	.35	.93	3250	13720
23	6.03	2.28	.15	.93	.85	1560	8640
24	6.39	2.12	.16	.84	.84	2600	13100
25	10.70	1.98	.24	.89	.76	1150	4500
26	14.60	1.86	.29	.95	.71	835	3180

table 1

Coefficient of Saturation = Proportion of voids filled.

Coefficient of Density = $\frac{\text{Spec. Mass Density}}{\text{Spec. Gravity}}$

BRICK TYPE	MORTAR			TENSILE BOND LB./SQ. IN.	Per Cent Break		PER CENT EFFICIENCY OF JOINT
	CEMENT	LIME PUTTY	SAND		IN MORTAR	AT INTERFACE	
Same as 101 to 106	1	1	5	46	40	60	36
	1	1½	6¼	76	65	35	90
	1	2	7½	67	48	52	81
22	1	0	2½	31	0	100	10
	1	1	5	66	35	65	53
	1	2	7½	44	18	82	53
23	1	0	2½	27	50	50	9
	1	1	5	61	40	60	49
	1	2	7½	27	8	92	33
24	1	0	2½	125	73	27	41
	1	1	5	124	80	20	100
	1	2	7½	83	75	25	100
25	1	0	2½	56	62	38	18
	1	1	5	62	5	95	50
	1	2	7½	33	48	52	40
26	1	0	2½	9	10	90	3
	1	1	5	24	0	100	19
	1	2	7½	16	2	98	19

table 2

STRUCTURAL ANALYSIS . . . brick and mortar

brick leakage

An "absorptometer" has been developed at Massachusetts Institute of Technology by Walter C. Voss, professor of building construction, as a means of studying the structure and strength of brick. In the following report, prepared especially for *The Architectural Record*, Prof. Voss describes his investigations and conclusions:

Brick walls, known for almost 7,000 years, still cause trouble by leakage and much more so in this day of thin walls, dense hard bricks, and equally strong dense cement mortars. The solution to the problem lies in matching the brick and mortar. Neither can be chosen at random or without respect for the other.

Brick porosity: The absorptometer (Figure 1) has been helpful in determining the physical characteristics of the unit. For any group of brick the values are plotted in rectilinear time-absorption curves, as illustrated. Chart 1 indicates 5 brick of the same type: note that they travel in a family. Chart 2 shows a group of brick of different types: note in this case how they vary in their tendencies. . . . The fundamental characteristics of all these brick are given in Table 1. High coefficients of saturation indicate an extremely open structure easily penetrated by capillary moisture. When combined with a low coefficient of density this may indicate under-burned brick, undesirable because they disintegrate in weather. An average value of .70 to .80 is not objectionable, but when the coefficient of saturation drops, as it sometimes does, as low as .20 the brick is one which will greatly aggravate possibilities of leakage with almost any mortar.

Adhesion tests: After the brick have been classified, assemblages such as shown in Figure 2 are made with three different mortars. These are selected by experience, one being assumed as probably correct, the other two being on either side, namely, too high in cement and too high in lime. . . . The results of the tests of such tensile bond specimens are given in Table 2. An assemblage should develop an efficiency of at least 50 per cent and the percentage of break in the mortar should exceed 40.

Bond layer: Petrographic examination of thin sections has revealed to us some extremely interesting and at the same time baffling phenomena. We are not, even now, certain of the constitution of this "bond layer." The interfacial layer is probably some form of calcium hydroxide, perhaps not the same form as we have in slaked lime or hydrated lime but nevertheless a chemical compound of this same material, and quite likely the carbonate. . . . The compounds which are formed by the hydration of portland cement are what the geologist terms "isotropic" and appear under the microscope as a dark gray and somewhat opaque substance. Likewise, the formation of any compounds such as calcium hydroxide or calcium carbonate (limestone) appear under the microscope as birefringent. These

birefringent materials are highly reflective to light and appear as a definite pearly structure. . . . Generally, where high cement content mortars are used, evidences of this highly birefringent bond layer are absent or small in extent. When this layer is absent the mortar has often separated completely from the brick, showing that a destructive differential volume change was at work and has left a capillary plane which might later allow the entrance of water. Such a condition is rarely present where higher proportions of lime are used in the mortar. (See Figures 3 and 4.)

Capillary leakage: Not only must there be sufficient contact between the mortar and the brick at the interfacial plane to produce strength, but it is extremely important, for watertightness, that this contact be continuous and over the entire surface as nearly as possible. When the mortar is of such a nature as to build up the bond layer over the entire surface, we are more likely to obtain permanence of bond and less leakage in the wall. . . . In other words, although we are interested in the strength of the bond we are primarily concerned with its completeness. It is found that the leakage through assemblages where reasonably good brick and mortar are used is not through the mortar or the brick, if these remain intact, but through a ruptured interfacial capillary plane which is so small in dimension that it cannot be detected by the naked eye, but which induces capillary suction sufficient to carry water directly into the wall through the entire length of the brick contact with the mortar.

Water planes: Another factor resident in the physical nature of the brick itself is the possibility of water planes forming at this critical juncture because of insufficient absorption by dense brick or because the mortar is robbed of necessary moisture by too porous a brick. (See Figure 5.) The first danger may be present in either high cement or high lime mortars and must be guarded against when brick are selected for a project. The latter danger may be obviated by eliminating from use any brick which have absorptions of over 10 per cent where the lower lime content mortars are used or by resorting to higher lime contents in the mortar in order to get the advantages which lime has introduced, namely, that of water-retaining capacity. This again points in the direction, certainly for general use, of higher lime contents for mortar, and when coupled with the characteristic behavior of lime in producing a complete and continuous bond layer, will result in much better walls than we have had occasion to witness during the past decade or two.

Recommendations: Use uniform, homogeneous brick with an absorption of from 5 to 10 per cent in 48 hours. It will be safe to specify a mortar composed of 1 volume of cement, 1½ volumes of slaked lime putty, and 6 to 7 volumes of sand. Fill all joints. Insist upon the use of the shovelled joint. Keep the joints as thin as practicable and tool with a concave surface after the mortar has had ample time to solidify.

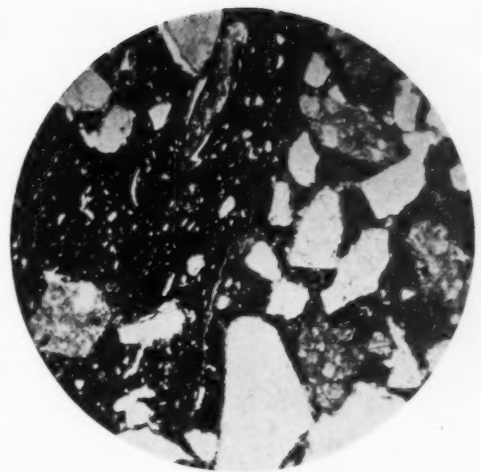


figure 3—shrinkage crack results from differential volume changes in the cement mortar and dense brick assemblage

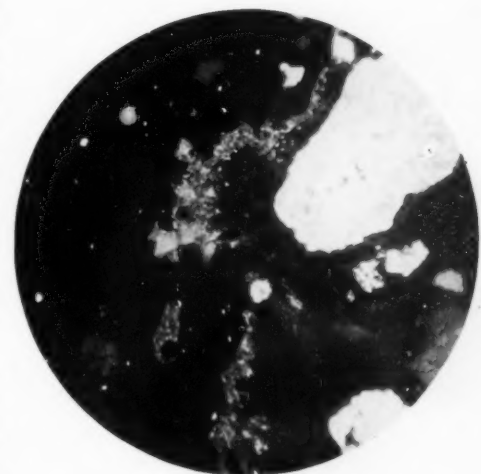


figure 4—well-defined layer and intimate bond occur when lime is added and brick has reasonable absorption



figure 5—effect of water plane at interface showing the possibility of leakage

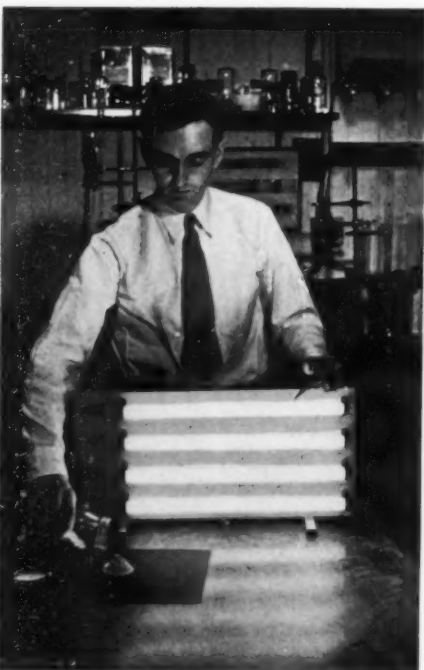
CONTROL OF LIGHT



new mercury arc light source being tested by Dr. John W. Marden (Westinghouse)



capillary lamp (G. E. Vapor Lamp Co.)



demonstration of fluorescent lamps by G. E. Inman at the Nela Park laboratories

midget suns

New mercury arc lamps were demonstrated March 25 for the first time before a joint meeting of the American Institute of Electrical Engineers and the New York Electrical Society. The lamps are not yet in production; they are being developed experimentally in the laboratories of Westinghouse Lamp Co., Bloomfield, N. J.—work is also under way at General Electric Co., Nela Park, and General Electric Vapor Lamp Co., Hoboken, N. J.—on the basis of preliminary research by The Phillips Incandescent Lamp Works, Ltd., Holland.

The brilliance and color of sunlight is approached in a special type of mercury arc lamp, known as the "capillary" or "peanut" lamp because of its relatively small dimensions. Metallic mercury in a tiny quartz tube vaporizes when submitted to an electrical discharge, and sets up a glow of light which becomes more brilliant as the wattage increases. The greater the amount of electrical energy sent through this vapor of metallic mercury, the nearer does the color composition of its light resemble that of sunlight.

Relative efficiency: The mercury arc lamps producing light by this method operate at unusually high efficiency. So much of the electrical input is converted into light that it is believed three times the amount of light can eventually be obtained for the same amount of electricity now utilized for lighting purposes. . . . In the demonstration, such a mercury arc, arranged to consume 2,000 watts of electricity, produced light equivalent to 150 filament lamps of the familiar 50-watt size or a total of 7,500 watts. Its 65 lumens per watt efficiency can be compared with the 3 lumens per watt efficiency of early carbon filament lamps as a measure of the progress in artificial illumination during the past fifty years.

Color quality: The light of this brilliant mercury arc approaches sunlight in its color characteristics, and perhaps more so than the light of any other single light source today, that is, with any degree of efficiency. The mercury light, however, is stronger in green and yellow colors, but this is an advantage because the human eye is most sensitive to light in the yellow region of the spectrum. According to Dr. John W. Marden, Westinghouse research scientist—"If in time we can further improve the quality of light from this mercury arc, we will be able to duplicate sunshine in every way, even to ultra-violet radiations; in fact, the ultra-violet content of this mercury light is proportionately greater than in sunlight."

Heat intensity: Temperatures produced in the mercury arcs are so high that no instruments now available can measure them. They must be calculated. The temperature of the sun's surface is about 6,500 degrees Centigrade (11,732 degrees Fahrenheit). That of the axis of the arc stream, a banana-like area of electrically-excited gas which produces the light of the mercury arc,

reaches 14,000 degrees Centigrade (25,232 degrees Fahrenheit).

Types: Air-cooled lamps, in their present state, are only about 2 inches long and about $\frac{3}{8}$ inch in diameter. They produce an amount of light equivalent to that given by a 200-watt filament lamp—a lamp which is about eight inches long and about $3\frac{1}{2}$ inches in diameter. . . . Water-cooled lamps, although extremely small in size, can be made to give an extremely brilliant light. For example, the heart of a capillary lamp—only 1 inch long and $\frac{1}{8}$ inch in diameter—produces as much light as the present 1,000-watt filament lamp. Raising the pressure within these little lamps increases the production of the red rays. At the highest pressures yet attained in the laboratory—equivalent to several tons per square inch—the brightness of the light produced exceeds that of the sun. When capillary lamps operate under very high pressures, they are apt to break from excessive heat; hence the need of an outer jacket to permit a flow of water to carry away this heat. . . . Because the quartz envelop is transparent to the shorter wave lengths of ultra-violet, the capillary lamp has been inclosed within an outer bulb absorbing the energy radiated within the erythema region as well as the shorter wave lengths. This lamp, like other mercury vapor types, must be used in conjunction with a transformer.

Applications: The light from air-cooled capillary lamps, being rather deficient in red rays, is somewhat inadequate where color discrimination is important. It is possible, however, to put them inside bulbs whose inner surface is coated with fluorescent powder. Early experiments in this connection show that use of the fluorescent powder greatly improves the color quality of the light produced. . . . The compactness of the units permits their introduction into almost any type of lighting fixture and combination with incandescent units for the modification of incandescent light. Because of their high brilliancy, the units may also be adaptable to certain types of high intensity localized lighting, for example, highlighting in connection with the general floodlighting of a building. Other possible future uses include the floodlighting of golf courses, bathing beaches, stadiums, industrial yards, and the like.

fluorescent lamps

Demonstrated at the A. I. E. E. and N. Y. E. S. meeting. These lamps are not yet in production; they are being developed experimentally by General Electric Co., Nela Park, and General Electric Vapor Lamp Co.; also by Westinghouse Lamp Co.

Unusual effects in color are promised by these new low-intensity light sources. The lamps are designed to convert invisible ultra-violet radiation into visible radiation by activating a fluorescent coating on the inside of the bulb. A wide range of colored light is obtainable at low wattage. The efficiency is many times greater than the efficiency of

• • mercury arcs, fluorescence, floodlights, coves

lamps in which colored light is produced by the filtration of incandescent light.

Lamp construction: The lamp, tubular in design, is sealed at each end by a flat piece of metal. Within the bulb there is a trace of mercury, a small amount of argon gas at extremely low pressure, a suitable kind of fluorescent powder which clings to the inner surface of the glass. When electricity is passed into this lamp the argon gas serves as a "starter." In a moment or two, the lamp produces a feeble blue light and a great amount of ultra-violet radiation. The invisible rays excite the powder, causing it to fluoresce in the form of colored light. . . . Like most gaseous discharge lamps, these fluorescent lamps require special transformers which serve as valves in controlling the electrical flow. Unlike some mercury lamps, however, they take but a few seconds to get under way.

Color control: The visible radiation is characteristic of the fluorescent substance. Newly developed synthetic fluorescent materials sensitive to the extremely short ultra-violet of the kind that does not ordinarily pass through glass make possible the production of light of a desired color. . . . The fluorescent lamps should not be confused with the so-called neon lamps, whose color is a function of the specific gas used. While similar in many respects, the fluorescent lamps, owing to the mercury vapor they generate, are able to give far more ultra-violet for the current used than do the gaseous discharge lamps. The more ultra-violet rays, the brighter the glow from the fluorescent coating.

Relative efficiency: The conversion of the invisible radiation into visible radiation is the reason for the greater efficiency of the fluorescent lamps as sources of colored light (including white light). Tungsten filament lamps produce light containing all colors of the spectrum, but to get any one color, all the remaining colors must be removed by filtering, which means wasting them. In a blue bulb, for example, only the blue rays of the tungsten light are seen by the eye: the rest are filtered out by the blue glass. The chemical reaction of the ultra-violet radiation and the fluorescent substance gives 50 to 120 times as much colored light, for the energy used, as do colored incandescent lamps. (All light efficiency comparisons, it should be noted, necessarily involve a definition of the desired color balance.)

Applications: According to Dr. L. J. Buttolph, engineer, General Electric Vapor Lamp Co.—"Since the fluorescent materials are placed on the surface of tubes or bulbs, the lamps are inherently low brightness sources requiring no diffusers. As such, they are suited for architectural use, particularly where it is desirable to have the tubular forms a basic part of the architectural design. Light sources of this type permit a variety of pastel shades in colored light, hitherto difficult to obtain by the use of colored filter glasses on incandescent sources. They are also suited to cove light-

ing in which continuous light sources are installed in continuous reflectors. It will be recalled, for example, that thousands of small incandescent lights are used on the *Normandie* to throw moldings, in many cases 20 or 30 feet long, into relief. In order not to run into a prohibitive wattage in work of this kind, inefficient individual incandescent units of very small wattage must be used and even then they must be placed so far apart that lighting is spotty. The fluorescent lamps with their low wattage and their uniform brilliancy per unit length are ideal for such use."

mercury-incandescent floodlights

Installed by General Electric engineers at a gasoline station in Schenectady, N. Y.

Mercury and incandescent lamps have been combined in street-lighting units and other luminaires (see "Technical News and Research, page 243, March issue), but this is the first time the two lamps have been used in a floodlight. One 400-watt mercury lamp is mounted between two 150-watt incandescent lamps in each unit. Because of the blending of the blue-green light of mercury and the yellow-white of incandescent the unit gives a quality of light not obtainable with incandescent alone. The mercury lamp gives twice as much light for the energy consumed as do the incandescents.

cove lighting

Information presented by C. S. Woodside, Westinghouse engineer, at the 1935 meeting of the Illuminating Engineering Society in Cincinnati:

Basically, cove lighting is a form of indirect illumination wherein the wall or ceiling becomes a secondary light source. This being the case, it is quite essential that the wall or ceiling reflecting surface should be of a diffusing nature. For best results, the ceiling or coffer should be vaulted, with the light source located just beneath the spring of the curve.

Projecting troughs: When the cove is constructed as shown in Figure 1 a continuous source of light, such as a row of Lumiline lamps, should be used. Individual lamps, spaced six bulbs or more apart, will produce an undesirable scalloped effect above the cove.

Recessed troughs: With this type of construction (Figure 2) lamps may be spaced on 16 to 18-inch centers and still produce a uniform appearance above the cove. This wide spacing makes it possible to use a smaller number of higher efficiency lamps, thus providing more illumination at no increased expense. The reflecting surface should be a mat surface using porcelain enamel, Alzak processed aluminum, white plastic, or plaster. . . . Figure 3 indicates an effective method of installing projector-type cove lighting equipment.

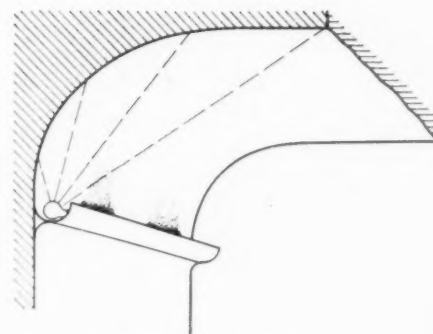


figure 1—projecting trough

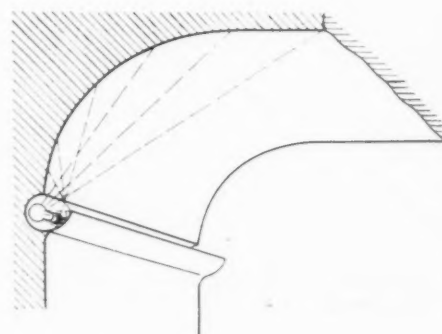


figure 2—recessed trough

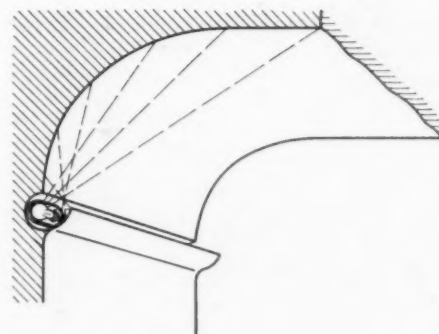


figure 3—recessed projectors

STRUCTURAL SYSTEMS roofs, elevators

flexible roof monitors

Used in construction of the new cold finishing steel mills at River Rouge plant of the Ford Motor Company at Dearborn, Mich. Designed and patented by Giffels and Vallet, Detroit architects.

The new roof construction, known as the "two-way monitor plan," is designed to achieve a more even distribution of natural light and to overcome objectionable ventilation features. Three longitudinal monitors run the length of the building, one on each side and a larger one in the center. A series of transverse monitors run at right angles to the longitudinal members, from one side to the other, and are attached to the center monitor, opening into it. The monitor windows face all four directions, and by this simple arrangement it is possible to utilize the light rays and atmospheric currents to a greater extent than has heretofore been possible, regardless of the direction of their source.

Improved lighting: With other roof types there often are some points inside the building where the light is insufficient for effective work, while at other points illumination is three times as great. Roofs with butterfly or "A" frame monitors, all running parallel, admit outside light in varying quantity according to the time of day and shadows about large machines are inevitable. The two-way monitors insure admission of light regardless of the location of the sun; with light coming from four directions heavy dark shadows are avoided. . . . A strong uniform natural light of about 35 c.p. at the working-plane comes through the 108,000 square feet of window sash—nearly $2\frac{1}{2}$ acres of glass—contained in the monitors. It is estimated that three months' accumulation of dirt on window glass cuts the lighting efficiency about 50 per cent; only 25 per cent of the full amount of available light penetrates a six months' coating of dirt. For this reason more than a mile and a half of walkways have been installed inside the monitors, making every inch of glass easily accessible. The high central monitor has an aluminum-alloy ladder and a movable platform on each side to facilitate washing. Outside panes are washed from adjacent roof areas by means of long-handled mops.

Improved ventilation: With butterfly and "A" frame monitor construction air passes into the mill through ground level windows; wind currents passing over the monitors, at right angles, create a suction on the lee side which permits bad air to be extracted from the building through the leeward-opened windows. This ventilation system is satisfactory as long as wind currents flow across the butterfly and "A" frame monitors. Should the currents be parallel to these monitors, however, the suction effect is counteracted by a subsequent inward suction which tends to pull the bad air back into the building. With the two-way monitor system air is pulled out the lee side of the monitors—either transverse or longitudinal—at all times, whether the wind be at right angles to one group of monitors or the other. If wind currents are diagonal, both the trans-

verse and longitudinal monitors are effective. All monitor windows are motor-operated in groups. A large variety of window openings is available to meet varying atmospheric conditions. Air can be brought in and discharged at almost any desired point. A wide range of air changes per hour is possible.

Snake pattern monitors: The same basic design appears in the roof system of the new press shop of the Briggs Manufacturing Co. in Detroit (likewise developed by Giffels and Vallet). Because of the building's relative narrowness and its extensive glass wall area, the need for long lengthwise monitors was less great, and consequently the transverse and longitudinal monitors have been combined into a continuous pattern.

automatic elevator signals

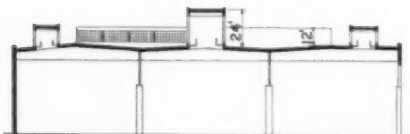
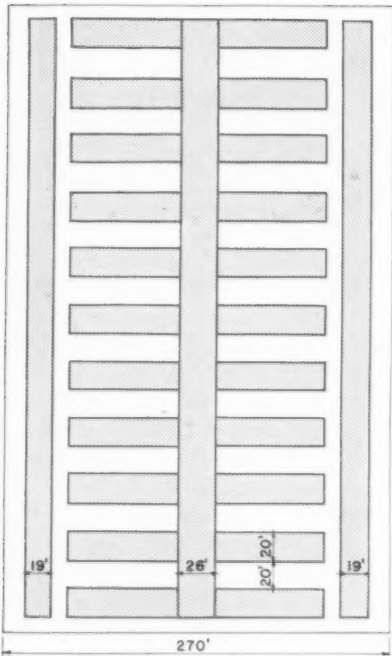
Developed by Westinghouse Elevator Co. Clyde R. Place, consulting engineer. Installed in the new 41-story International Building, New York; designed by Reinhard & Hofmeister; Corbett, Harrison & MacMurray; Hood & Foulhoux, architects.

A new signaling and dispatching system has been designed to speed up vertical transportation service in the latest addition to Rockefeller Center. This project—one of the largest entertainment and office-building developments in the world—already boasts elevators that can be run as fast as 1,400 feet a minute when traffic so demands. During performance tests a speed of 1,500 feet a minute—a record for passenger cars—was attained.

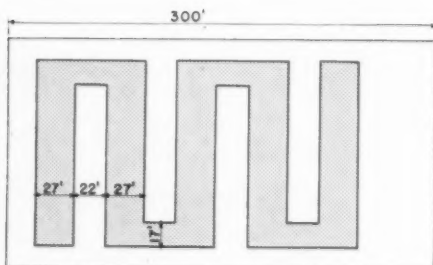
Dispatching system: Each car has four lights—two yellow, one green, one red. If the cars run on a 30-second schedule, the operator gets a flash from one of the yellow lights 30 seconds before the green start-up light or the red start-down light comes on. In this way he knows he is next in sequence.

Hall signals: As soon as the operator gets the next-start signal, the terminal hall lights flash likewise and passengers are notified that the car is next to leave the landing. When a waiting passenger presses a hall button, the floor signal for the car that will answer the call flashes immediately. A low-toned single-stroke bell sounds simultaneously and attracts the passenger's attention so that he will go to the proper entrance and be ready to board the car as soon as it reaches the landing.

Automatic quota system: Hall calls are answered in quotas and in sequence. When one car has received its quota of calls, the floor-call zone is automatically transferred to the next following car. In this way the cars are kept equally spaced in the hoistways. Quotas may be changed to suit traffic conditions by throwing the proper switch on the dispatcher's panel on the ground floor. If a car should become loaded before its quota is complete, the operator presses a bypass button which automatically transfers the unanswered calls to the next car; when this happens, the floor signals are also changed so that waiting passengers can go to the right entrance.

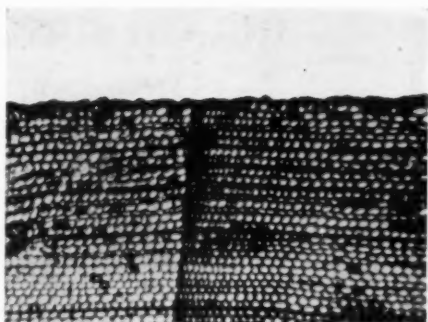


two-way monitor system on Ford plant

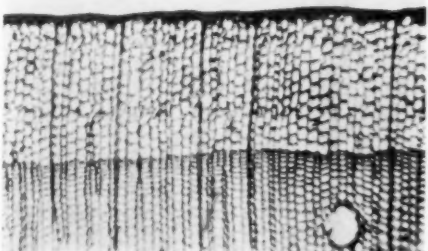


snake pattern monitor system on Briggs shop

MATERIALS, PARTS . . . finishes, insulation, windows



microscopic view of cross-section of wood shows penetration of ordinary paint oil



a definite line marks extent of controlled oil penetration in a new type of paint

controlled penetration paint

Process developed by Dr. J. S. Long, research technician, in laboratories of Devoe & Reynolds Paint Co., Louisville, Ky. (Sweet's Catalog File 16/16)

By this new method of processing oils for house paints, control is gained over the extent of oil penetration into the surface upon which paint is applied. A certain amount of the oil in the paint must penetrate into the wood grain to give good adhesion, while enough oil should remain in the surface paint to give protection against extreme conditions of temperature, moisture and dryness. Theoretically, with an oil of good penetrating qualities, the surface of the paint would have inferior resistance to weathering, whereas with a non-penetrating oil the under coat would not have good adhesive qualities. By chemically combining the two types of oil—known as the "penetrative ingredient" and the "sealer ingredient"—the penetrative characteristic of the final product is controlled in direct proportion to the ratio of the two ingredients which compose it. . . . According to the manufacturer, two coats of the new paint suffice where formerly three coats were required.

metal sprayed like paint

"Mogul Gum" developed by Metallizing Company of America, Inc., 1218 Long Beach Avenue, Los Angeles.

Metallizing is a process of spraying molten metal so that it will adhere to almost any solid base. Wood, brick, tile, glass, plaster, concrete, cement, fabrics, paper, leather, stone or metals can be surfaced, regardless of size, to prevent corrosion, to offset effects of abrasion and erosion, and to obtain decorative effects. . . . The new metallizing unit has been designed for high production work. It is light enough—5½ pounds—to be used as a hand tool.

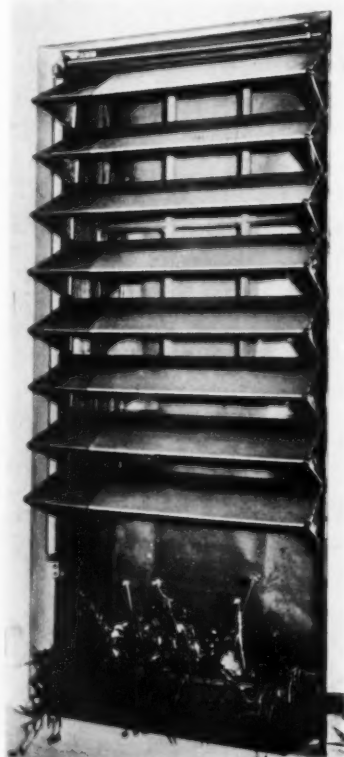
Finishes: The steels, nickel and copper alloys, bronze, zinc, aluminum, lead and tin are typical applications. The metallized coating looks like cast metal, and is usually wire brushed and oxidized. . . . The average cost of spraying non-ferrous metals on concrete is \$1.50 a square foot, on steels \$1.25 to \$1.50 a square foot.

improved sheathing

Developed by Insulite Co., Minneapolis. (Sweet's Catalog File 13/19)

"Bildrite Sheathing" is intended to provide insulation as well as bracing strength. It is impregnated with a special asphalt emulsion during the manufacturing process to give increased strength and resistance to moisture absorption and air infiltration. Tests show the bracing strength of the sheathing to be four times that of 8" ship-lap and its insulation three times that of ordinary lumber.

Application: Panels are shipped with light scorings on the surface to indicate proper nail spacing. Including the time needed for job preparation, 132 square feet of the material can be applied per man per hour.



awnings of copper or aluminum

Economics: For a heating season in the northern zone, where the record was kept, the saving in fuel amounted to approximately \$10 per thousand square feet of wall area over ordinary sheathing (fuel costs figured at \$13 per ton for coal and 7c per gallon for fuel oil).

smooth-finish insulating board

Announced by Armstrong Cork Products Co., Lancaster, Pa. (Sweet's Catalog File 13/43)

The coarse textured surface has been eliminated in the new board, known as "Temlock De Luxe." A smooth finish is obtained by an exclusive surface treatment and the full insulating value of the board is retained. It is available in standard size boards, 4' x 8' to 12'. In addition to the natural golden buff color, the new board also is furnished in white, cream, ash and walnut.

air-pad flooring

Produced by Voorhees Rubber Mfg. Co., Inc., 125 East 46 St., New York. Cost: slightly more than ⅛" hand-made inlaid linoleum.

Sponge rubber and reinforcing fabric are vulcanized to the back of rubber flooring material to provide a quiet and resilient floor surface. The fabric prevents stretching of the rubber under traffic. The sponge rubber yields when the air-pad flooring is walked on, so there is less likelihood of slipping. The material is produced in 6-foot widths and in lengths ranging from 60 to 90 feet; there are 9 marbled and 7 plain patterns. The flooring is suited for residences and for commercial and institutional buildings where a quiet work space is desirable.

prefitted windows and frames

Fabricated by Farley & Loetscher Mfg. Co., Dubuque, Iowa. (Sweet's Catalog File 11/16)

Two types, known as "Unipak Unique" and "Farlo," are available as complete window units, consisting of wood frame, double-glazed sash, weatherstripping and hardware. The wood sash are grooved and fitted with the "Unique Sash Balance" (see Sweet's Catalog File 18/6), which permits the elimination of weight boxes and pulleys, and results in narrow mullions and trim.

fireproof metal awnings

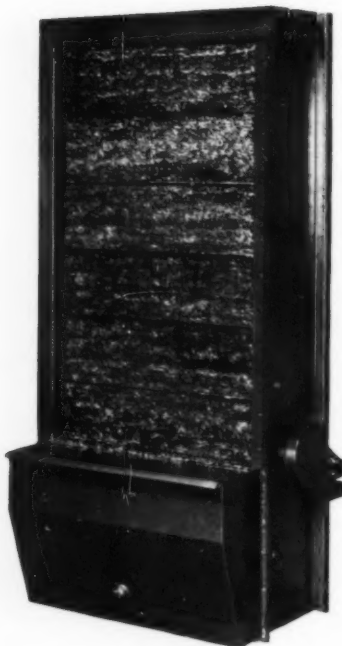
Manufactured and distributed by Burns Metal-Lite Awnings, Inc., 52 Randolph Ave., Brooklyn, N. Y.

The awnings are made of rustproof Anaconda copper and aluminum. Standard sizes are furnished for 30 to 48-inch windows; other sizes are made to order. Natural metal or special colors are available. . . . Strong sunlight is diffused into the room through reflection on the louvers. The awning construction prevents the formation of heat pockets. Adjustments of position are made by means of a crank.

AIR CONDITIONING • VENTILATING • HEATING



summer air conditioner



automatic air filter

portable summer air conditioner

Produced by Carrier Engineering Corp., 850 Frelinghuysen Ave., Newark, N. J. (Sweet's Catalog File 26/3) for the lower-priced field.

A single unit has ample capacity for spaces from 1,500 to 3,000 cubic feet; multiple units take care of larger areas. The refrigerating machine and evaporator coils, fans and controls are all contained within the cabinet (40" high, 36" wide, 18" deep), which may be equipped with castors for moving from room to room. Location beneath a window is required; by means of a duct connection outside air is brought in for condensing purposes and for ventilation. Aside from this, an electrical connection from a standard floor or baseboard outlet is all that is necessary. A number of standard household voltages, including direct current, may be used. A centrifugal type fan circulates cooled dehumidified air at the rate of 250 c.f.m.

automatic air filter

Developed by Staynew Filter Corp., Rochester, N. Y.

Four successive stages of filtration are provided in the form of two endless curtains arranged to rotate in such a manner that the face of the curtain on the dirty air side is thoroughly cleaned before returning to the clean air side. The first stage collects the heavier part of the dust and breaks up the air flow into intimate contact with the adhesive surface. The curtain passes through an oil bath which releases the surface tension of the oil film, thus allowing the dust particles to settle by gravity to the bottom of the reservoir. Leaving the oil bath the curtain enters the second stage, where it traps finer particles of dust that may be left in the air stream. The second curtain—stages three and four—operates in a dry state and arrests both oil and dust that may have escaped the first two stages; it is cleaned by an air line. . . . The filter curtain consists of panels of wire cloth to which are attached successive layers of knitted copper mesh. Average current consumption of the filter motors is between 2 and 3 kw.-hr. a month, with the automatic control operating continuously.

electric heating unit

Announced by The Electric Air Heater Company, Division of The American Foundry Equipment Company, Mishawaka, Ind.

The "Electromode Convection Heater" utilizes the natural rise of warm air for circulation. It is a $\frac{3}{4}$ kw. unit, self-contained and $4\frac{1}{2}$ " wide, $9\frac{1}{2}$ " long and 16" high. The unit is available in any finish. Completely insulated throughout, it may be placed flush with the wall with safety. It can be used for heating chilly bathrooms or as a temperature booster in rooms hard to heat. . . . The element is cast aluminum construction. Heating is by means of a calrod, around which the aluminum is poured. Shrinking of the metal in cooling causes the calrod to become an in-

tegral part of the heating element and eliminates all hot wires and dead air space.

high-speed air circulators

Announced by Emerson Electric Manufacturing Co., St. Louis. (Sweet's Catalog File 26/63)

The fans are suitable for large rooms requiring high-velocity air circulation. They can be furnished with four styles of mountings—ceiling, wall bracket, counter column, and adjustable floor column. A 24-inch single-speed fan has an air delivery of 3,600 c.f.m. with 185 watts input. A 30-inch two-speed fan has an air delivery of 6,000 c.f.m. on high speed with 355 watts input.

automatic coal burners

Five models introduced by Kelvinator Corp., Detroit. (Sweet's Catalog File 26/12)

Each model may be used with warm air, steam, hot water, or vapor heating systems. Through underfeeding and controlled forced draft, the coal burners provide for the complete combustion of fuel. Coal is brought in under the fuel bed and pre-heated; the volatile gases are distilled off and, passing up through the fire bed, are ignited, eliminating smoke. Air is delivered to the fuel bed by means of a specially designed tuyere block. Five speeds and neutral permit proper feeding for the prevailing weather. Coal feed capacity per hour of the five models ranges from 7 to 150 pounds of coal. The smallest size has a hopper capacity of 350 pounds; the other models have hopper capacities of 500 pounds.

protected oil burners

Announced by Harvey-Whipple, Inc., Springfield, Mass.

New safety controls have been made standard equipment on the "Master Kraft" oil heaters. An electrical device, called "Borkontrol," automatically prevents the burner from operating in case of transformer failure. A thermo-release switch prevents damage to the motor in the event of a stalling overload.

streamlined boiler

Introduced by Fitzgibbons Boiler Co., Inc., 570 Seventh Avenue, New York. (Sweet's Catalog File 26/27.) Displayed for first time at Detroit Oil Burner Show.

The new model of the "Oil-Eighty Automatic Boiler" incloses the burner and all controls within a new jacket design.

new gas heater

Designed by Harold Van Doren. Marketed by Utility Gas Appliance Corp., Columbus, Ohio.

The new heater is fabricated of blue mirror glass, chrome metal and heat-resistant fire-clay. All surfaces are easily cleaned with soap and water.

OUTSTANDING PERFORMANCE

*for removing
seepage water*

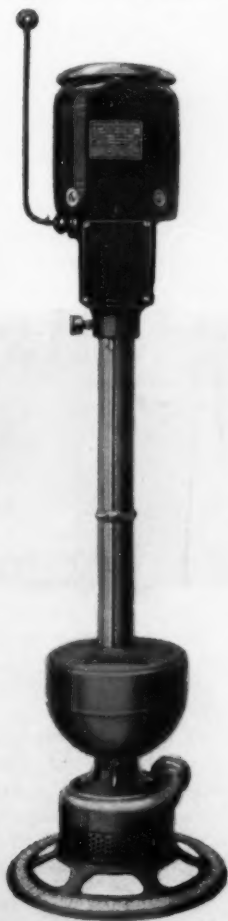
*for modernizing
hot water heating systems*

**PENBERTHY AUTOMATIC
CELLAR DRAINER**

(Water or Steam operated)
Made in 6 sizes

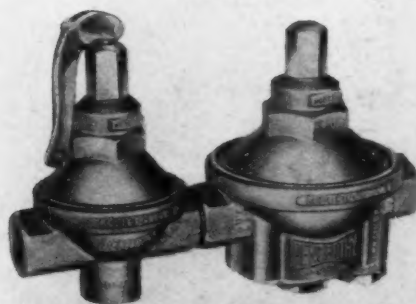
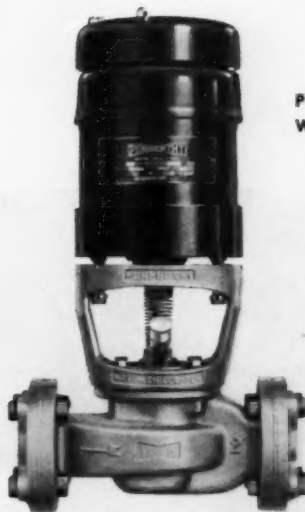


**PENBERTHY AUTOMATIC
ELECTRIC SUMP PUMP**
Made in 6 sizes



Advanced and rugged design, copper and bronze construction throughout, and careful workmanship are responsible for the demonstrated superiority of these Penberthy pumps wherever seepage water accumulates. Leading jobbers stock Penberthy products.

**PENBERTHY
WATER CIRCULATOR**
Made in 3 sizes



PENBERTHY PRESSURE & RELIEF CONTROL
Made in 2 Models

Relief valves and pressure reducing valves are other items in the line of Penberthy Hot Water Heating Specialties. All are constructed of high grade steam bronze; design and workmanship are also of exceptional quality. Your jobber will gladly give you complete information and supply your needs.

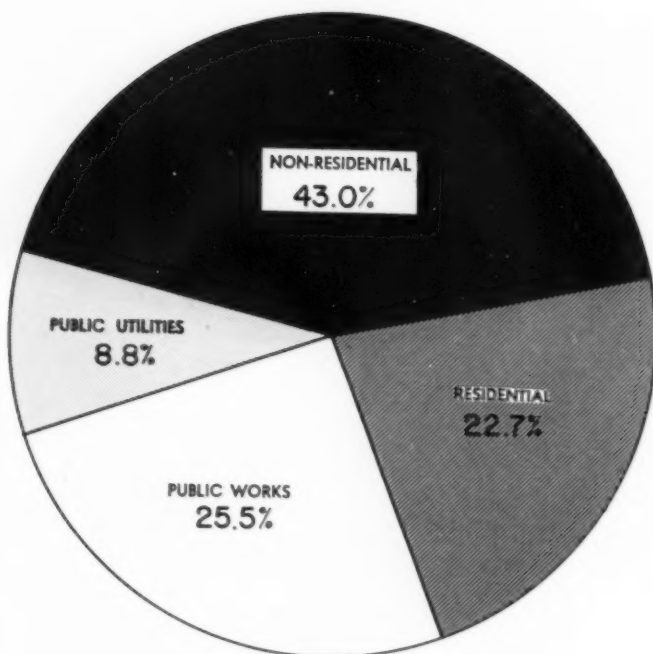


PENBERTHY INJECTOR COMPANY

Manufacturers of QUALITY PRODUCTS Since 1886
DETROIT, MICHIGAN • Canadian Plant, Windsor, Ont.

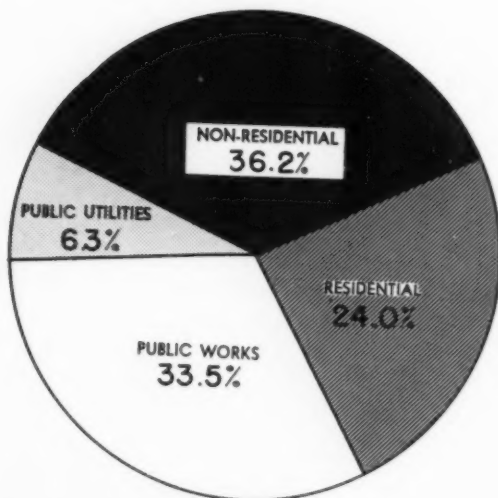
MARKED ADVANCES IN CONSTRUCTION ARE REPORTED IN FIRST QUARTER OF 1936

1936



FOR THE FIRST QUARTER OF 1936 a total of \$546,000,000 of construction work was undertaken. This chart pictures the distribution between major branches of work. A similar distribution for the first quarter of 1935 is shown below.

1935



FOR THE FIRST QUARTER OF 1935 the construction total was only \$298,000,000. Besides a large gain in total work in the first quarter of this year a comparison between the two charts indicates an appreciable realignment in the importance of major classes of construction.

By L. SETH SCHNITMAN,

Chief Statistician, F. W. Dodge Corporation

Hitherto laggard, construction has become more active than at any time since 1931. This improvement was due about as much to gains in private projects as in public undertakings. The contract value for all classes of construction undertaken in the 37 eastern states during the first quarter of 1936 was 83 per cent higher than the total for the corresponding period of 1935 and was almost three times the total for the first quarter of 1933, the low point of the depression.

For residential building alone the first quarter total recorded a 75 per cent gain over the volume for the like 1935 period; increases were well distributed geographically and as between small and multiple-family dwelling types.

By far the largest quantitative as well as relative gain over 1935 has thus far been recorded for nonresidential building types. In this category, a first quarter increase of almost 118 per cent occurred. Educational buildings, factories, and commercial types showed the largest quantitative improvement, though gains also occurred in hospitals, public buildings, religious and memorial structures, and social and recreational types.

For public works of engineering descriptions, a first quarter increase of only 40 per cent was reported as contrasted with the total for the first quarter of last year. Public utility types, due chiefly to expansion in airport facilities and railroad work, recorded a first quarter total about 2½ times as large as the volume for the first quarter of 1935.

The outlook for the second quarter of the year, covering all classes of construction, is encouraging. The total should not only exceed the volume for the first quarter of 1936 but will likely exceed the figure for the second quarter of 1935 by at least 40 per cent. Residential and nonresidential building will probably account for about two-thirds of the second quarter construction total, the remainder going into engineering descriptions, such as highways, bridges, sewage systems, water supply systems, and the like.

The percentage distribution covering the first quarter of 1936, as between major branches of work, is given in the upper chart. For purposes of comparison the results for the initial quarter of 1935 have also been charted. These charts have been drawn to scale, their respective sizes indicating, at a glance, the improved conditions of 1936. The chart on the succeeding page gives the first quarter construction record by major geographic territories.

All charts cover data for the 37 states east of the Rocky Mountains only.

★

Let's talk about **AIR** **CONDITIONING**

★

THE planning of an air conditioning system is not, in itself, a particularly technical job. It is concerned with the distribution of air, in and out of rooms, or buildings. This passing of air through ducts has been quite well understood for some time.

One element was lacking

The idea sometimes implied that air conditioning is a mystery may go back to the days when it was an unsolved idea. For a long period the notion of controlling the heat and moisture content of air within buildings had attracted thoughtful attention. The chief difficulty lay in the absence of a safe, economical refrigerant. Since summer air conditioning is basically cooling and dehumidifying, this lack of a suitable cooling medium was serious.

To advance the application of electric refrigeration for use in air conditioning, General Motors sponsored a search for a new and

better refrigerant. After thousands of experiments the searchers discovered a new liquid. They called it FREON. So brilliantly has FREON met every hoped-for requirement that the whole air conditioning industry adopted it almost overnight. Not until the perfection of FREON did air conditioning, for business places and homes, become really practicable. And with this discovery, the last mystery faded from the air conditioning picture.

Refrigeration is the basis

Summer air conditioning basically is cooling and dehumidifying. The accepted method is by electric refrigeration. Obviously, then, the factors which determine the effectiveness and economy of an air conditioning system go back to the manufacturer of the refrigeration equipment used. Consider his experience in the design, manufacture and application of this equipment. Delco-Frigidaire, through its

General Motors background, represents such experience to the greatest degree of any organization in the field.

We welcome opportunities to confer with architects. On such occasions we strive not to beat the drum of sales talk. Rather we offer such suggestions as have come out of our long experience in the fundamentals that have made air conditioning possible.

2 ACCEPTED
FACTS ABOUT AIR CONDITIONING
THAT POINT TO ONE CONCLUSION

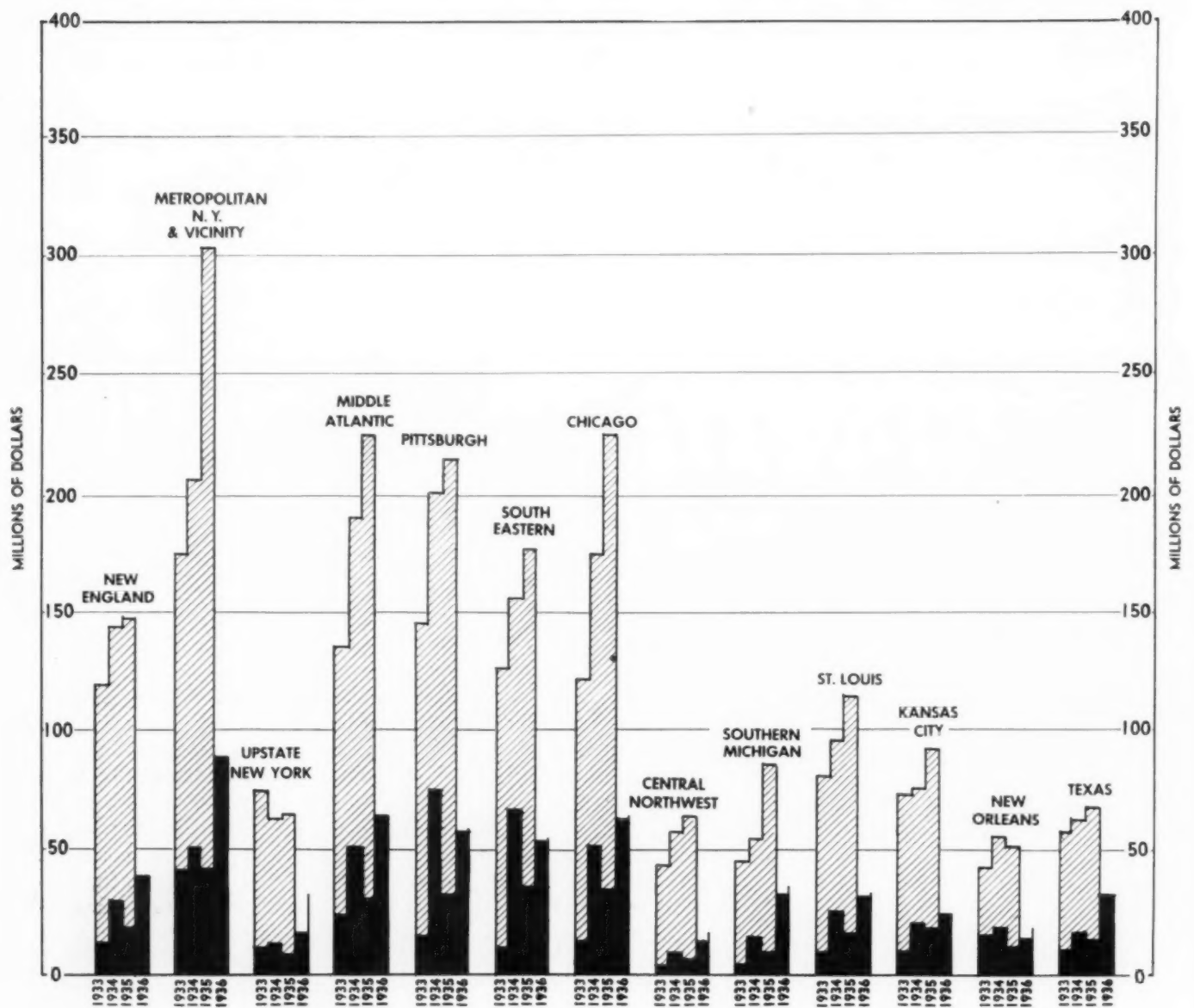
1 Summer air conditioning is basically cooling and dehumidifying.

2 The accepted method of accomplishing this is by electric refrigeration.

CONCLUSION
Buy air conditioning from Delco-Frigidaire—the organization representing most experience in electric refrigeration.

*See Sweet's Catalogs File (Section 26/7) for details on our air conditioning equipment.
Write our headquarters at Dayton, Ohio, or telephone our New York office at BRyant 9-0452*

DELCO-FRIGIDAIRE CONDITIONING CORPORATION
AUTOMATIC HEATING DAYTON, OHIO AIR CONDITIONING
PRODUCTS OF GENERAL MOTORS



CONSTRUCTION CONTRACTS BY TERRITORIES

With only three exceptions construction work undertaken in the 13 major geographic territories east of the Rockies was larger during the first quarter of 1936 than for any similar charted period. Heights of bars indicate annual totals for designated years; black portions show totals through March of each of the charted years.

CONSTRUCTION CONTRACTS BY TERRITORIES FIRST QUARTER TOTALS: 1936 AND 1935 COMPARED

TERRITORY	RESIDENTIAL BUILDING		NON-RESIDENTIAL BUILDING		PUBLIC WORKS		PUBLIC UTILITIES		TOTAL CONSTRUCTION	
	1936	1935	1936	1935	1936	1935	1936	1935	1936	1935
New England	\$ 8,539,500	\$ 4,673,900	\$ 17,360,900	\$ 10,386,200	\$ 9,844,400	\$ 5,609,000	\$ 6,231,800	\$ 894,500	\$ 41,996,600	\$ 21,563,600
Metro. N. Y.	28,866,900	17,299,300	29,813,300	15,639,100	15,864,400	7,717,200	15,161,500	5,852,100	89,706,100	46,507,700
Upstate N. Y.	1,215,200	715,100	7,223,800	6,015,700	8,987,200	1,986,700	911,300	169,300	18,337,500	8,886,800
Middle Atlantic	18,797,900	10,438,800	28,892,200	11,559,300	13,409,000	7,101,500	5,323,900	2,103,900	66,423,000	31,203,500
Pittsburgh	12,650,700	6,662,200	30,086,600	14,952,700	8,986,600	9,064,300	6,097,000	1,278,400	57,820,900	31,957,600
Southeastern	14,393,300	12,523,300	23,163,900	11,132,100	12,777,500	11,437,500	3,200,000	1,222,000	53,534,700	36,314,900
Chicago	8,721,400	3,326,100	28,813,600	12,323,900	25,705,100	15,948,800	2,134,100	2,839,700	65,374,200	34,438,500
Central Northwest	1,890,800	815,400	5,213,000	2,495,900	6,673,600	4,090,700	1,703,000	335,400	15,480,400	7,737,400
Southern Michigan	7,017,700	2,332,200	19,078,600	4,298,000	5,584,800	3,778,100	1,626,000	314,000	33,306,500	10,722,300
St. Louis	6,107,700	4,702,800	10,419,300	4,922,100	13,158,200	8,080,200	1,403,200	1,097,700	31,088,400	18,802,800
Kansas City	5,486,100	2,405,100	8,385,400	6,292,300	10,996,900	10,649,500	1,561,600	2,016,000	26,430,000	20,762,900
New Orleans	2,044,000	1,155,200	4,710,100	2,295,900	5,968,700	8,922,900	830,100	139,500	13,552,900	12,513,500
Texas	8,134,400	4,187,000	21,390,900	5,734,600	1,507,600	5,624,000	1,787,200	804,400	32,820,100	16,350,000
37 EASTERN STATES	\$123,885,600	\$71,236,400	\$234,551,000	\$108,047,800	\$139,464,000	\$99,410,400	\$47,970,700	\$19,066,900	\$545,871,300	\$297,761,500

A new and more durable type of **BUILT-UP ROOF**



Thin copper in long sheets, 30" wide, combined with alternate layers of asphalt...ushers in a new phase of built-up roofing practice.

"Electro-Sheet" Copper, weighing 2 ounces per square foot, is *rust-proof* and *weather-proof*. It prevents deterioration of the "undercoats" of asphalt by providing a seal which eliminates air, moisture and destructive light rays. Thus the copper, firmly bonded to asphalt which retains its original plia-

bility, provides longer life and greatly reduced maintenance in this new-type built-up roof.

Easy to apply and moderate in cost...built-up roofs of Anaconda "Electro-Sheet" Copper are in tempo with the times, offering more service per year per dollar of cost. Roofs applied to date in all sections of the country afford ample confirmation. For further details on this durable roofing, write for Anaconda Publication D-2.



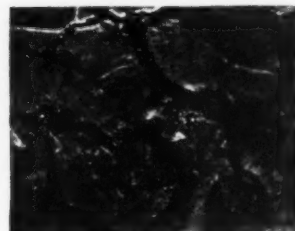
THE AMERICAN BRASS COMPANY

General Offices: Waterbury, Connecticut
Offices and Agencies in Principal Cities

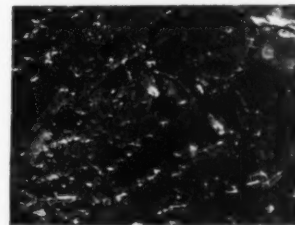
A 4-YEAR TEST

*Proves the Durability of
"Electro-Sheet" Copper*

These photos (actual size) illustrate continuous 4-year exposure test on small board, coated with asphalt and covered with 2-oz. "Electro-Sheet."



This section of the asphalt was *not* protected by copper at any time during the four years of exposure. As a result, it cracked badly and gave evidence of marked deterioration.



At the end of the 4 years, the "Electro-Sheet" was stripped from the asphalt pictured here. Its uneven surface texture is due to adherence of asphalt to copper. It has fully retained its original softness and pliability — clearly indicating the exceptional service obtainable from copper-asphalt roofing.

ANACONDA COPPER & BRASS

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and
DESIGN TABLES



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On the Use of
DOUGLAS FIR**

The "Douglas Fir Use Book" offers a large amount of new design information on Douglas fir: load tables for spans ranging from 3 feet to 50 feet in sizes from 2" x 3" to 24" x 40"; loads for inch widths; loads for plank and laminated floors; loads for posts and columns; a comprehensive grade-use guide; data on Structural Grades, and an illustrated explanation of the use of modern timber connectors—split-ring, toothed and shear plates.

\$1 per copy

The "Douglas Fir Use Book" may be ordered by letter or postcard. Payment may be made with the order or receipt of an invoice. It may be ordered on approval, and if copies are returned within 10 days the purchase price will be refunded.

WEST COAST LUMBERMEN'S ASSOCIATION
364 Stuart Building Seattle, Washington

MARKETING NEWS OF THE BUILDING INDUSTRY

drafting machine

New model (Wrigraph E-272) developed by L. G. Wright, Inc., 5713-49 Euclid Ave., Cleveland. Price: \$17

This device can be used in making drawings up to 20" x 26". It is a complete unit, mounted on a 22" x 30" cleated, white pine board. It may also be obtained with a special base plate for fastening to any flat wood surface without screws or clamps.

steel scaffolding

Developed by Uecker Equipment Co., Wauwatosa, Wis. Available on lease as well as by purchase.

Hollow seamless tubes are welded together to form sections which fit into each other in telescopic fashion through couplings. Thirty feet of framing can be created in 30 minutes.

lightweight brick

Manufactured by Illinois Clay Products Co., Joliet, Ill.

"Thermo-O-Flake" insulating brick weigh only 18 oz. in the standard 9" x 4½" x 2½" unit. They can be used for temperatures up to 2,000° F. without shrinking or disintegrating.

adjustable sash balance

Produced by Pullman Manufacturing Corp., 46 Ford Street, Rochester, N. Y. (Sweet's Catalog File 18/4)

A compact lightweight Sash Balance, unbreakable and completely incased in a pressed steel housing, is designed to take the place of bulky sash weights and pulleys. Any necessary adjustment to insure satisfactory window operation at all times is made with an ordinary screw driver while the sash and balance remain in place.

extension hinges for casements

Produced by Casement Hardware Co., 406 North Wood Street, Chicago. (Sweet's Catalog File 18/33)

The new steel "Win-Dor" hinges for wood casements are designed to extend the sash 4 inches away from the frame when the window is opened. The outside glass surface can thus be cleaned from inside the room. The opened sash also acts as a baffle for breezes, deflecting air into the room.

safety window device

Introduced by Howard Safety Window Co., Inc., 2101 W. Purdue Street, Milwaukee. Cost: about \$8.30 for a standard 24" x 24" window.

The fixture, attached to any standard window frame, has a metal shoe supporting the sash. This shoe slides in a metal channel. A releasing mechanism permits the two sashes to be adjusted in a variety of ventilating positions, adjustments being possible both up and down and inward. Windows may be left open in rainy weather. When they are open they are locked at the bottom, preventing entrance without breaking

the glass. Both sashes may be folded inward for washing the outside, and both may be withdrawn completely from the frame, separately and independently of the sash weight cords. Screens and storm sash may be removed from inside the building—another safety feature.

darkening shades

Manufactured by Cincinnati Fly Screen Co., Cincinnati. (Sweet's Catalog File 19/4)

A ball and slot mechanism secures the "Cinmanco Darkening Shade" in side channels, making the windows light-tight even under varying wind pressure. Shades may be installed with lightproof ventilators at either top or bottom, or both. Readily applied to all types of windows; for large installations the shades may be electrically operated. Suitable for hospitals, schools, laboratories, auditoriums, museums, factories, studios.

plaster base insulation

Manufactured by Milcor Steel Co., Milwaukee. (Sweet's Catalog File 14/7)

"Milcor Silvercote" consists of a heat-reflecting corrosion-proof insulating medium, backed up by a waterproof asphalt film, and attached to metal lath by staples. Plaster is easily applied.

flat wall paint

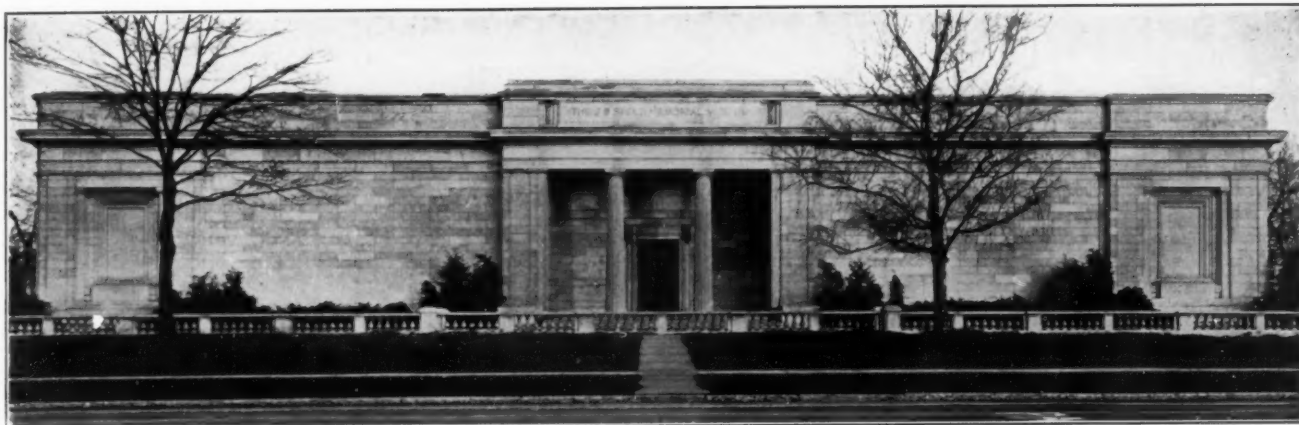
Announced by Fabrics and Finishes Department, E. I. DuPont de Nemours & Co., Inc., Wilmington, Del. (Sweet's Catalog Avenue, Los Angeles)

The new paint, known as "Du Pont Casein-Lithopone," has been designed to fill the gap between non-washable cold water paints and more expensive flat wall paints. It dries in two hours and gives a dull, washable coating. One coat is generally sufficient for walls that have been previously painted. It may be applied successfully over fresh plaster. White and nine pastel shades are available.

building cleaner

Model G Hypressure Jenny produced by Homestead Valve Manufacturing Co., Coraopolis, Penn.

Surfaces are cleaned with a combination of water vapor, hot water and cleaning chemicals, which is applied through a hose and nozzle at a pressure range of 50 to 150 pounds to the square inch. The equipment, available in either stationary or portable types, is fully contained, carrying water, solution and oil tanks, oil burner, vapor generator, water and solution pump, electric motor and a specially constructed vapor hose with a variety of shaped nozzles. A saturation selector enables the operator to change the spray and have a wetter or dryer vapor as needed; thus paint may be stripped by using very hot water containing a strong alkali, or by adjusting the spray and pressure, tar or very heavy grease may be blasted off.



Art Museum of the J. B. Speed Memorial, Louisville, Ky., protected with a Genasco Standard Trinidad Built-up Roof since 1926. Arthur Loomis, Architect; Wm. A. Netherland, Associate—Netherland & Hawkins, successors. National Roofing & Supply Company, Louisville, Roofing Contractor.

Specification:— A roof that will endure with the building

... and it was fitting that in 1926 a Genasco Standard Trinidad Built-up Roof was specified for the J. B. Speed Memorial, Louisville, Ky.

Today, ten years after its application, the Genasco Standard Trinidad Built-up Roof, is giving the same protection to the J. B. Speed Memorial as it did during its first year, and in all parts of the United States for more than a generation Genasco Standard Trinidad Built-up Roofings have given maximum protection to institutional, industrial, commercial and public buildings. For a Genasco Standard Trinidad Asphalt Roof is constructed with thoroughly saturated long-fibred all-rag felts and waterproofed with Trinidad Lake Roofing Asphalt. This roofing asphalt is made from native Trinidad Lake Asphalt—nature's own product

—famous for its waterproofing and weather-resisting qualities.

When you specify a Genasco Standard Trinidad Built-up Roof you can count on a roof that will "last with your building." Against two of a roofing's worst enemies—sun and water—you have in Trinidad Lake Roofing Asphalt a natural waterproofer, and a natural product inherently resistant against the destructive action of the actinic or ultra-violet rays of the sun.

We would like to send you a copy of our illustrated booklet "For Your Roof," showing many types of buildings in all sections of the country, where Genasco Standard Trinidad Built-up Roofs have been applied. Just fill out the coupon below.



THE BARBER ASPHALT COMPANY PHILADELPHIA

New York

Chicago

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Reg. U. S. Pat. Off.

STANDARD TRINIDAD Built-up Roofing

Roof security is felt with Trinidad

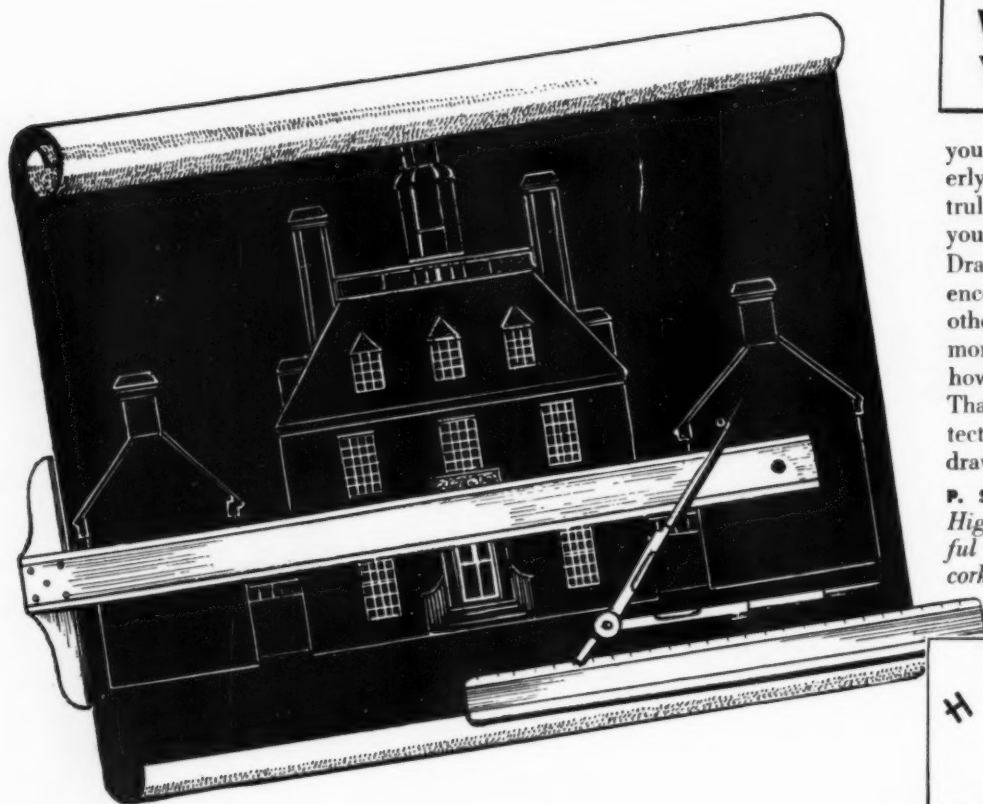
The Barber Asphalt Company
1600 Arch Street
Philadelphia, Pa.

AR-5

Please send me a copy of your illustrated book "For Your Roof" which carries illustrations of many prominent buildings in all parts of the country protected with Genasco Standard Trinidad Built-up Roofing.

Name.....

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you want an ink that flows properly at all times and one that is truly black when it dries. So you use Higgins American India Drawing Ink, for years of experience has told you that none other is quite so good. There's more than fifty years of knowing how in every drop of Higgins. That's why to artists and architects Higgins is drawing ink and drawing ink is Higgins.

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NEWS of the BUILDING INDUSTRY

G-E home building program

A brochure has been issued by C. M. Snyder, manager, General Electric Home Bureau, describing the "New American" home program for 1936. This program is intended to repeat last year's campaign to stimulate construction through the building of demonstration homes.

The company itself will build no homes, but again will sponsor a cooperative movement of material and equipment manufacturers, architects, builders, and other groups. The Home Bureau, it is stated, has been organized as a practical means for serving the architect and contractor. A staff is maintained to check plans and electrical specifications, as well as to consult with home builders.

research group to publicize heating

The Temperature Research Foundation has been established at 80 Broadway, New York, N. Y., by Kelvinator Corporation. The Foundation is intended to function as a clearing house for facts on heating; food preparation and preservation; air conditioning in home, office and factory; humidity control, and the filtration and circulation of air. Brochures, news bulletins, lectures and radio talks will be maintained to acquaint the public with the most recent developments in temperature engineering.

Edward Heitman, chief engineer of Kelvinator Corporation, is director of the Foundation. The advisory committee includes Shirley W. Wynne, former Health Commissioner of New York City; Dr. Warren M. Parsons, consulting economist and former professor of eco-

nomics at Harvard University; Francis Keally, architect; Count Alexis de Sakhnoffsky, consultant designer; Lulu G. Graves, consultant in nutrition and organization of dietary departments; and Anne Pierce, consultant in home economics.

marketing changes

Johns-Manville (Sweet's Catalog File 13/31) announces that it has arranged to expand its line of acoustical products by becoming sole distributors of "Acoustex" and "Silentile" non-combustible, noise reducing building materials manufactured by the Atlantic Gypsum Co., Boston (Sweet's Catalog File 13/28). These products are in addition to those developed in the J-M laboratories in the past 25 years.

The accurate Metal Weather Strip Company, Inc., has opened a new factory branch office at 1628 Callowhill Street, Philadelphia.

Harvey-Whipple, Inc., manufacturers of *Master-Kraft* Oil Heating equipment, have opened a direct factory branch at Pittsfield, Mass.

The selling organizations of the Roach-Appleton Manufacturing Co. and All-Steel-Equip Company, Inc. (Sweet's Catalog File 21/7) have been merged. The combined trademarks offer a complete electrical line—switch boxes, outlet boxes, conduit fittings, fuse-cabs, cutout boxes, and cabinets. *Raco - All-Steel - Products* are to be distributed by All-Steel-Equip Company, Inc., Aurora, Illinois.